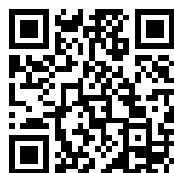

This is a reproduction of a library book that was digitized by Google as part of an ongoing effort to preserve the information in books and make it universally accessible.

Google™ books

<https://books.google.com>





Publication[s]

Rockefeller Sanitary Commission
for the Eradication of Hookworm Disease

Gen. Lib.

The University of Chicago
Libraries



GIFT OF

Rockefeller Sanitary Com.

248
5
[PUBLICATION NO. 1.]

SOIL POLLUTION

AS CAUSE OF

Ground-Itch, Hookworm Disease (Ground-Itch Anemia), and Dirt Eating.

By CH. WARDELL STILES, Ph.D.,
U. S. Public Health and Marine-Hospital Service.

A CIRCULAR FOR USE IN SCHOOLS

ISSUED BY

Given by
The Rockefeller Sanitary Commission

FOR THE

Eradication of Hookworm Disease.

WASHINGTON, D. C.

1910

MAILED
TO
SABELL COVINO

RC 248

R 5

no. 1-8

Notice to Pupils: Take this circular home and read it to your parents.

Notice to the Public: Copies of this circular can be obtained free upon application to The Rockefeller Sanitary Commission for the Eradication of Hookworm Disease, 811 Union Trust Building, Washington, D. C.

Notice to the Scientific and Medical Professions: The illustrations used in this circular are taken from a U. S. Government publication, now in manuscript, in which full professional details regarding the same are given.

TO SCHOOL TEACHERS

If an epidemic disease, such as yellow fever, cholera, or bubonic plague, is introduced into a neighborhood, great public excitement results. The epidemic is something unusual, and it becomes the topic of general discussion. Because of the unusual disease, and the exceptional number of deaths in a comparatively short time, the community is frequently led to adopt measures that are not only unscientific and unnecessary, but they are in some cases inhumane, and they not infrequently cause, to the city or State, losses in trade, money, and property. While the epidemic is still fresh in the memory of families whose homes have been invaded by it, there is considerable watchfulness against a possible return of the dread disease. As time goes on, the memory of the excitement, anxiety, and distress diminishes, and too often a self-satisfaction and false sense of security lead the people to be contented with conditions which would not be tolerated immediately following the epidemic.

Has it ever occurred to you that the great loss of human life in this country is at present due, not to extensive epidemics, but to preventable diseases that are constantly with us? And not only to *preventable* diseases, but to *easily preventable* diseases? For instance, has it ever occurred to you that in our country more people die in one year from tuberculosis (consumption) than have died in 114 years from yellow fever? Has it ever occurred to you that thousands of lives are needlessly sacrificed in this country every year simply because the general public is either ignorant of certain elementary principles of public hygiene or careless about these principles? Think of the fact that over 35,000 Americans die every year from typhoid fever—a preventable disease due to carelessness and filth!

It is you upon whom the country depends for training the young. The mind of the adult is largely dependent upon the training during childhood. If the child is taught that certain habits will result in sickness, and even in death, he will carry that lesson into his adult life, and when he has a voice in the government of the city or the State he will recall that lesson and insist upon laws which will stop certain objectionable customs to which, because of a lack of appreciation of the danger involved, the average adult of today too frequently does not give a second thought.

Will you as school teachers join in a movement to reduce the unnecessarily high death-rate among innocent thousands—a death-rate due in some cases to ignorance, in other cases to carelessness?

In considering this proposition, your attention is invited, not only to the importance of the subject, but also to the fact *that it involves work*. Short-lived enthusiasm will accomplish only short-lived good. The undertaking calls for earnest, continued, serious work, year after year. The reward for that work is not an increase in pay, but a knowledge of the important fact that **YOU WILL SAVE HUMAN LIFE**. You will save human life just as surely as does the man who plunges into a stream to rescue a drowning child.

Some of the teaching will involve a discussion of subjects not ordinarily mentioned in the school-room containing both boys and girls. *But human life is at stake, and in preparing this circular we must state facts in plain English; there is no escape from this method.* When delicate and unusual subjects are discussed, it is suggested that you divide the classes, boys in one class and girls in another. This can easily be done in schools with more than one teacher. If the facts stated are of such a nature that a woman feels a hesitancy in teaching them to boys, or a man feels a hesitancy in teaching them to girls, it would be well to call upon your local physicians, clergymen, or trained nurses to help you. You will have little or no difficulty in obtaining aid from your local physicians. That the clergymen in your neighborhood will aid you when requested is also a self-understood fact. Doubtless the trained nurses will be glad to help you in this work with the girls.

SOIL POLLUTION AS CAUSE OF GROUND-ITCH, HOOKWORM DISEASE (GROUND-ITCH ANEMIA), AND DIRT-EATING.

All children should learn these four rules for preventing disease, namely:

Rule 1. *Do not spit on the floor, for to do so may spread disease.* Both "consumption" and diphtheria are spread in this way.

Rule 2. *Protect against mosquitoes.* Mosquitoes spread malaria ("chills and fever," or "ague"), yellow fever, dengue fever (also known as "break-bone fever"), and elephant foot.¹

Rule 3. *Do not pollute the soil.* Hookworm disease is spread only by soil pollution. Typhoid, dysentery, and other intestinal diseases are usually spread by soil pollution.

Rule 4. *Protect against flies.* These carry filth and germs to the food, and thus spread typhoid fever. They may spread other diseases, also, such as consumption, inflammation of the eyes, etc. Flies are filthy creatures and should be kept out of the house.

There are many other important points in protecting against disease, but these four rules are of greatest importance, especially for the Southern States.

Question 1. What is "soil pollution"?

"Soil pollution" is the act of defiling the soil or rendering it unclean; it also refers to the condition of the soil caused by defiling it. The word "*pollution*" means about the same as the words "defilement," "uncleanness," and "impurity." Polluted soil, therefore, is soil or ground which has been defiled, or made impure or unclean, or contaminated.

Usually, when we speak of "soil pollution," we mean that the ground has been made unclean by placing upon it decaying or rotting material or germs which cause disease.

Question 2. What are the common methods of polluting the soil?

Suppose that a person has consumption, and that, instead of spitting into a cuspidor or spittoon, he spits on the ground; his spit or expectoration contains little germs, which are so small that they

¹ Elephant foot or elephantiasis is a disease in which the foot or leg swells up so as to be much larger than it should be; it is found in warm (or tropical) climates.

cannot be seen by the naked eye. These little germs are scattered on the ground, and, of course, they render the soil impure, and are likely to spread consumption to healthy people. It is chiefly because of this danger of spreading consumption that we see so many signs with the words "*Do not spit on the floor.*"

Or, suppose that a person has some disease of the kidneys or of the bladder, and that, instead of passing his water into a privy, he passes it onto the ground or into a brook; he pollutes or contaminates the ground or brook with the germs which cause his disease, and thus he may spread his sickness to other people.

Or, suppose that a person has disease germs in his bowels, and that, instead of going to a privy or a water-closet, he goes into a field or the woods and stools there; he pollutes the soil, and may thus spread his sickness to other people.

In today's lesson we are to study this last method of soil pollution.

Question 3. Does the Bible warn against soil pollution?

Yes; see Deuteronomy xxiii: 12 and 13:

"12. Thou shalt have a place also without the camp, whither thou shalt go forth abroad;

"13. And thou shalt have a paddle upon thy weapon; and it shall be, when thou wilt ease thyself abroad, thou shalt dig therewith, and shalt turn back and cover that which cometh from thee."

Question 4. What is hookworm disease?

Many people, especially in warm climates, have in their bowels a small worm (see figs. 1, 2) about half an inch long and about as thick as a small hair-pin. If a person has many of these worms he becomes weak and sick, and his sickness is called "hookworm disease."



Figure 1. A male hookworm (♂), natural size. For enlarged picture see fig. 9.

Figure 2. A female hookworm (♀), natural size. For enlarged picture see fig. 10.

Question 5. How is hookworm disease spread?

A person who has hookworm disease spreads it by polluting the soil. The worms cannot multiply in the bowels, but they lay hundreds of minute eggs (see fig. 3), and, when the person stools, these eggs are passed in the discharges.

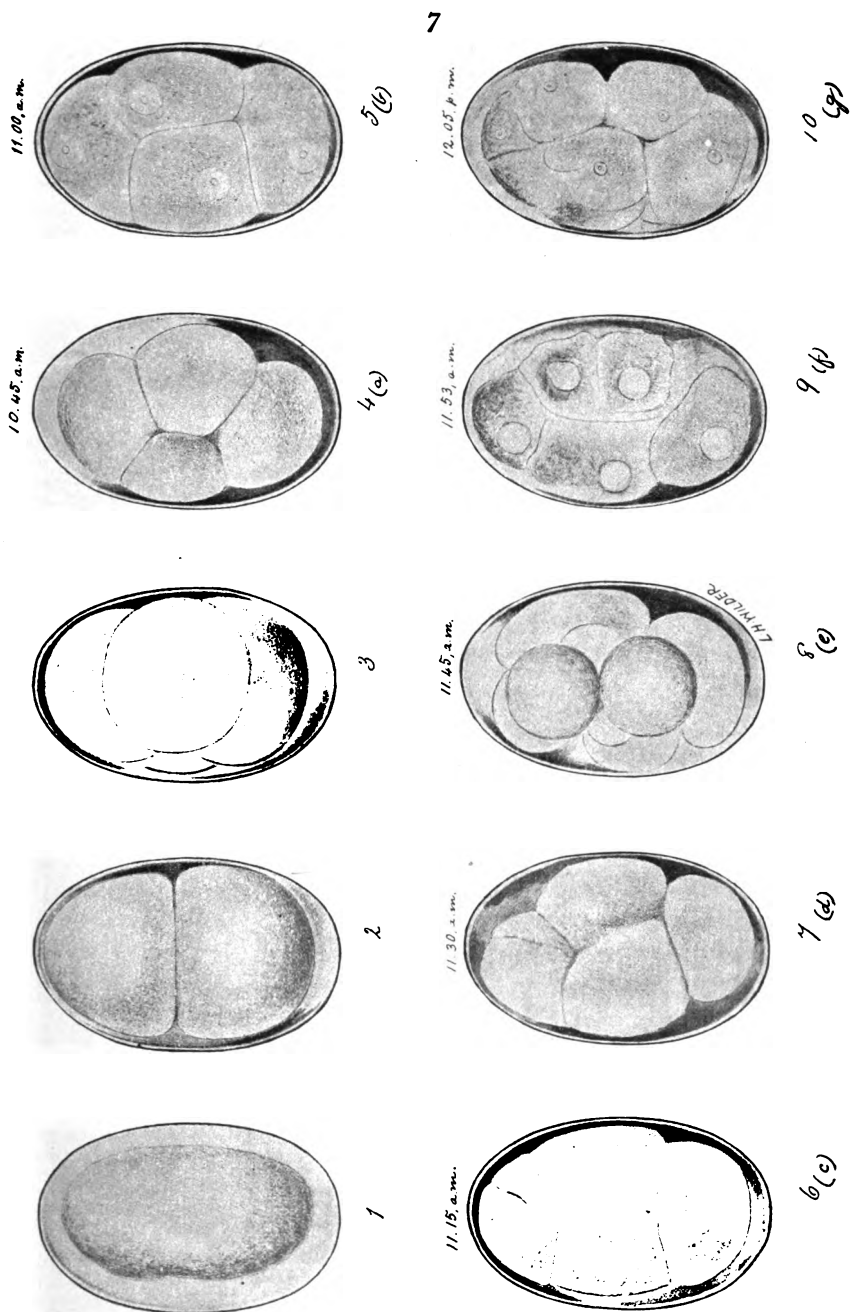


Figure 3. A hookworm egg in process of development. At first this egg contains only 1 cell (see 1), which later divides into 2 cells (2), each of which divides, thus forming 4 cells (3, 4, 5); these cells keep on dividing until, sometimes by the end of 8 hours, a young worm (see fig. 4) is formed.

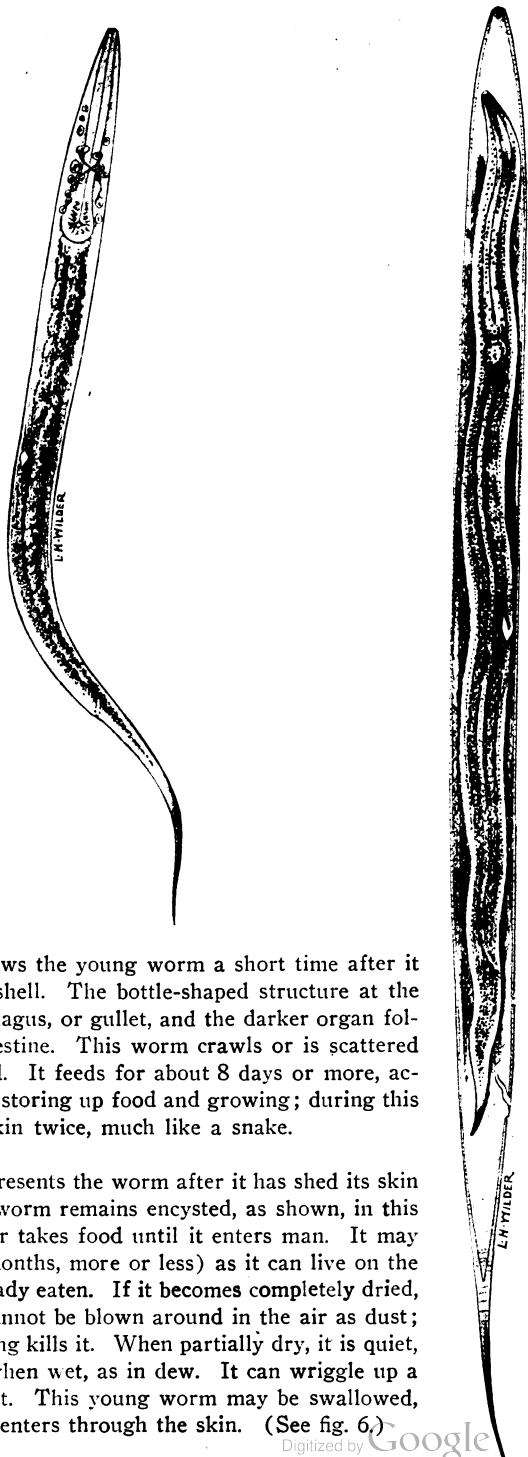


Figure 4. This shows the young worm a short time after it escapes from the eggshell. The bottle-shaped structure at the blunt end is the esophagus, or gullet, and the darker organ following this is the intestine. This worm crawls or is scattered around on the ground. It feeds for about 8 days or more, according to conditions, storing up food and growing; during this process it sheds its skin twice, much like a snake.

Figure 5. This represents the worm after it has shed its skin the second time; the worm remains encysted, as shown, in this skin; it now no longer takes food until it enters man. It may live just so long (5 months, more or less) as it can live on the food which it has already eaten. If it becomes completely dried, it dies; therefore it cannot be blown around in the air as dust; prolonged solid freezing kills it. When partially dry, it is quiet, but it is very active when wet, as in dew. It can wriggle up a surface which is moist. This young worm may be swallowed, but more generally it enters through the skin. (See fig. 6.)

Question 6. What happens to the eggs?

In about a day, if the weather is warm, a very tiny worm (see fig. 4) hatches out of each one of these eggs; this worm feeds for about a week; then it stops feeding and waits (fig. 5) for a chance to enter some person. It is very active when moist, but very quiet when dry; if it becomes completely dry it dies.

Question 7. How does this worm enter people?

The young worm enters the body in two ways:

a. If there is a heavy dew, or if it rains, or if the worm is living in a moist, shady place, the young worm is very active; when a

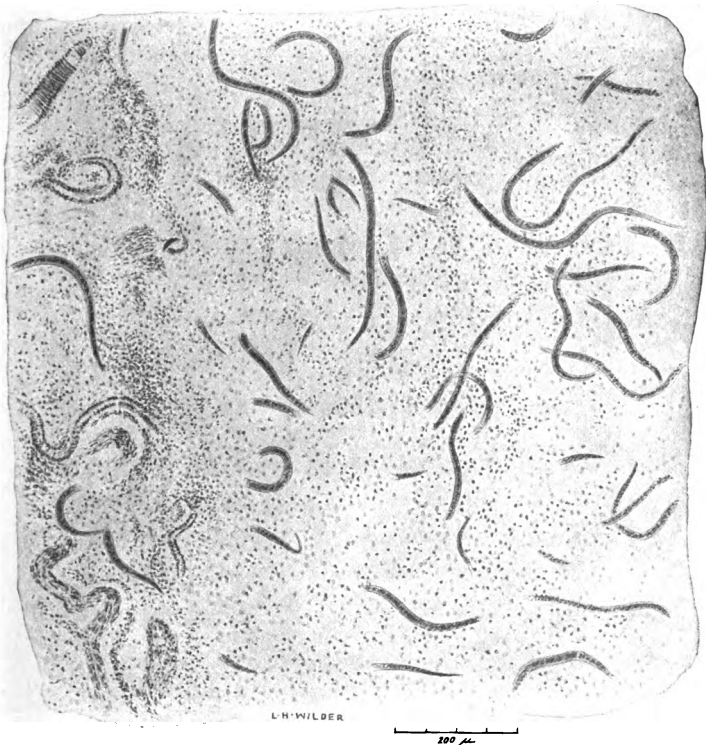


Figure 6. This shows a slice of skin as seen under the microscope. Notice how the young hookworms are crawling through the skin. This is the way "ground-itch" or "dew-itch" looks. (Next see fig. 7.)

person walks barefooted over the ground which is polluted by the presence of this young worm, the hookworm crawls into the skin (see fig. 6). Or,

b. The young worms may be swallowed, either in drinking water or with some salad or other food upon which they have crawled.

Question 8. If the worm enters the skin, what does it cause?

When this young worm enters the skin it causes "ground-itch," also known as "toe-itch," "foot-itch," "cow-itch," "dew-itch," or "dew-poison." Thus "ground-itch" results from soil pollution, and is the beginning of hookworm disease. On this account hookworm disease may be called "ground-itch anemia," which means that a person is pale and has pale, watery blood, caused by the hookworms which entered his skin.

Question 9. How many of this class have had "ground-itch"?

Question 10. Describe "ground-itch."

"Ground-itch" is a disease of the skin caused by coming into contact with moist, polluted soil. It usually occurs on the feet, on which account it is sometimes called "foot-itch," or "toe-itch." It is very likely to occur when there is a heavy dew on the ground, and on this account it is frequently called "dew-itch," or "dew poison." It is not caused by the dew, but by tiny worms, which are very active when moist, as when there is a heavy dew. These tiny worms enter the skin and cause a small swelling; this swelling may form into an irregular line resembling a vine. The foot itches and this itching makes a person scratch his toes and feet.

Question 11. Of what disease is ground-itch the beginning?

Ground-itch is usually the beginning of hookworm disease. If a boy has only a slight attack of ground-itch he may not be very sick, but if he has frequent and severe attacks of ground-itch he may grow pale and weak, and may become quite sick.

Question 12. How can ground-itch be prevented?

Ground-itch can be prevented by preventing soil pollution from the discharge from the bowels. Good privies should be built; people should be taught about the danger of soil pollution and the sickness due to it; they should be taught that they must stool in privies instead of on the ground; and they should be taught to clean the privies.

Ground-itch can usually be prevented by wearing shoes, but the most important thing is to prevent soil pollution.

Question 13. In what part of the world does ground-itch occur?

Ground-itch occurs in warm climates. Thus, in the United States, it is common south of the Potomac River.

Question 14. At what age is ground-itch most common?

Ground-itch is more common in children than in adults.

Question 15. Why is ground-itch more common in children?

Because children go barefooted more than adults.

Question 16. Does ground-itch occur in all parts of the South?

Ground-itch is more common in the country districts than in the cities, and it is more common in sandy districts than in clay districts.

Question 17. Is ground-itch the early stage of any disease other than hookworm disease?

Perhaps some cases of ground-itch develop into a peculiar disease known as Cochin-China diarrhea.

Some cases of ground-itch appear not to be followed by either hookworm disease or by Cochin-China diarrhea; these cases are not yet understood.

Question 18. Why is ground-itch more common in the country districts, as on farms, than in the cities?

Ground-itch is more common in the country districts than in the cities because there is less care taken in the country to prevent soil pollution than there is in the cities. In large cities the city government places long pipes under the ground; from these large pipes smaller pipes run into the houses, and water-closets are built in the houses and connected with these smaller pipes. All of these pipes together form what is called the "sewer system," and the discharges from the body are carried far away from the houses, so that the ground around the houses is not polluted. In smaller cities and towns the houses have privies in the back yards, and, when these privies are properly built, and cleaned regularly every week, as they should be, the soil does not become polluted. But on the farms and in the very small towns people are not so careful to prevent soil pollution, so that ground-itch is more common. Only about 60 per cent (or 6 out of 10) of 581 farm-houses, recently examined in 5 Southern States, had privies; on account of this lack of privies, ground-itch is very common on the farm.

Question 19. Why are there so few privies on the farms?

Because it has only recently been discovered that ground-itch is the beginning of hookworm disease, and that this disease is common

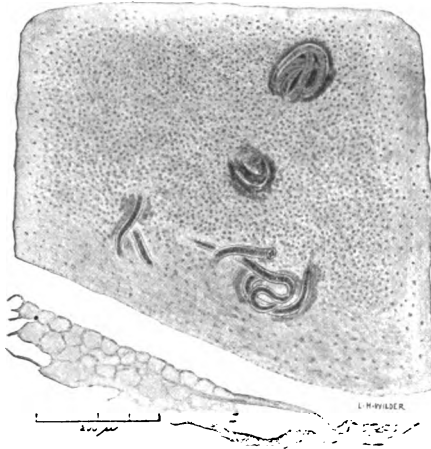


Figure 7. This shows some young hookworms in an organ of the armpit (axillary gland). (Next see fig 8.)



Figure 8. This shows a young hookworm in the blood in the heart. (Next see fig. 11.)

in our country, and when our fathers and mothers went to school they were not taught how dangerous it is to pollute the soil.

Question 20. How does ground-itch turn into hookworm disease?

The young worms crawl from the skin into the blood (figs. 7 to 11), and from the blood they finally reach the bowels (fig. 18); they form a poison which injures the body, and they suck the blood. In this way they make people weak and sick.

Question 21. How does a person look when he has hookworm disease?

A person with hookworm disease may have very dry hair and dry, tallow-like skin; he is pale; often he has sores or ulcers on his shins; his abdomen (belly) or his legs may be swollen. When children have the disease they are likely to be stunted in their growth.

Question 22. How does a person feel when he has hookworm disease?

A person with hookworm disease usually says he has headaches, dizziness, buzzing in the ears, palpitation of the heart, and soreness in the pit of the stomach when you press on it; he may be very weak, and not able to work hard, walk far, or study much; he gets tired easily; sometimes he complains that it is hard for him to breathe; usually he does not sweat much.

Question 23. Does hookworm disease make it harder to study?

Yes. Although some pupils with hookworm disease are able to learn their lessons and to stand well in school, many others are too sick to study, and they fail in their examinations and become "repeaters."¹

Question 24. Can hookworm disease be cured?

Yes. There are only a few diseases which can be cured so easily as hookworm disease.

Question 25. If a person has had ground-itch and is pale, what should he do?

He should ask his father or mother to take him to the family doctor (physician), and should ask the doctor whether he has hookworms.

¹ A "repeater" is a pupil who spends more than one year in a grade; he "repeats" his work for the year.

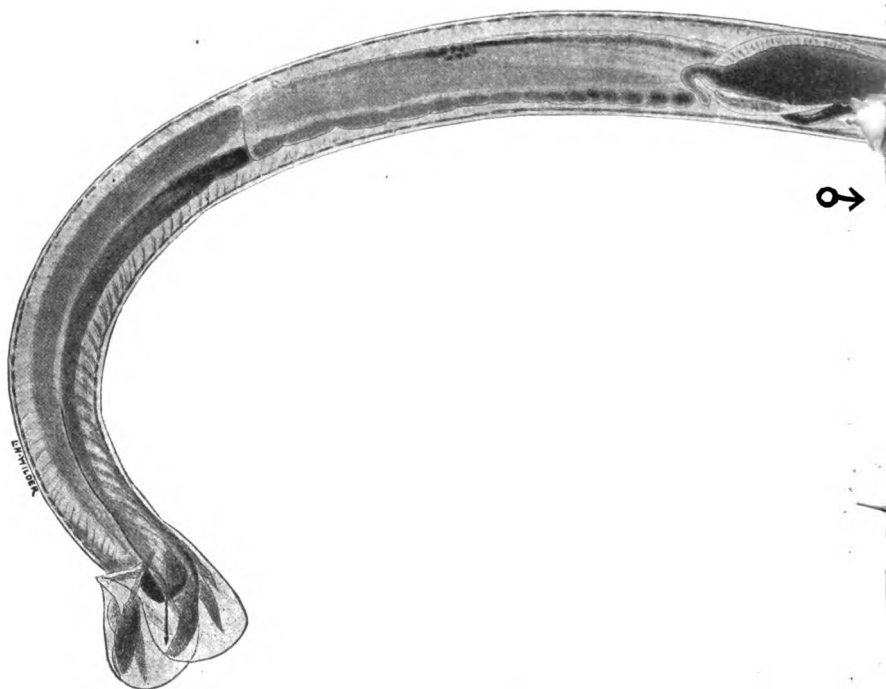


Figure 9. A male hookworm (known as the American Murderer—because it kills its host) seen under a microscope. See how its head is turned backward, and

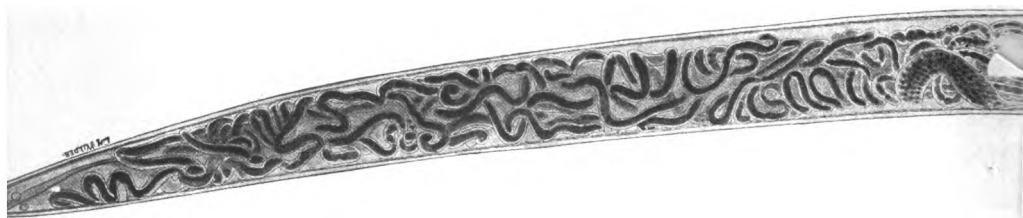
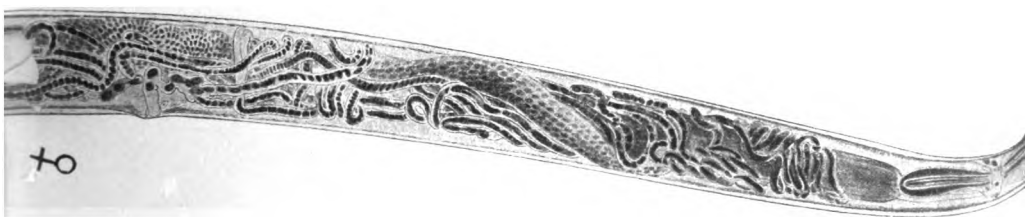


Figure 10. A female hookworm, very much magnified. See how its head is turned forward,



kills so many people), very much magnified under an instrument known as
and how its tail is broadened into an umbrella-like organ.



and backward and how its body is filled with organs containing hundreds of eggs.

Question 26. Can a doctor tell whether a person has hookworms simply by looking at him?

Yes, in case the person has a great many hookworms and is clearly sick from the disease. If the person is not sick enough so that the

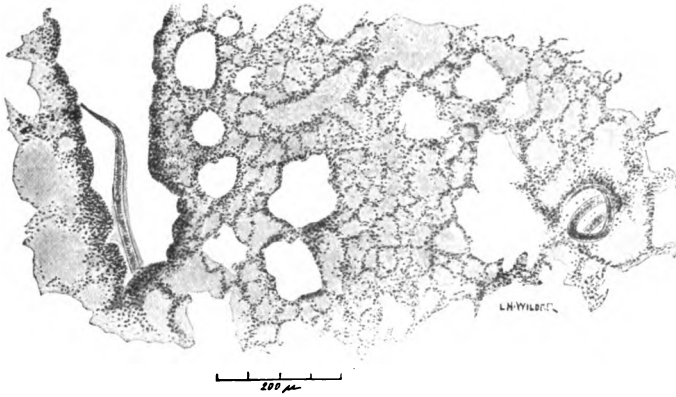


Figure 11. This shows two young hookworms in the lungs. The worm on the left is entering the air tubes. (Next see fig. 12.)

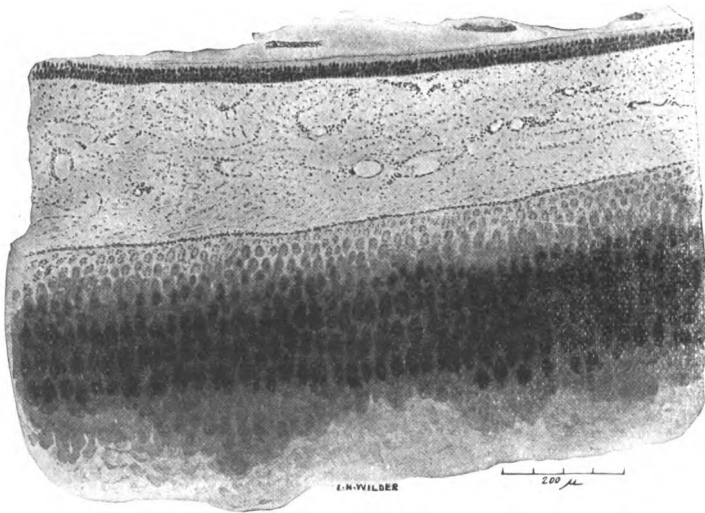


Figure 12. We now find young hookworms (see the three spots on the top of the picture) wandering up the windpipe (trachea). (Next see fig. 13.)

doctor can be sure whether the patient has hookworms, it is necessary to give to the doctor a specimen (about half an ounce) of the fresh

passage from the bowels; this is sent by the doctor to the State Board of Health or to the State laboratory, where it is examined to see whether it contains hookworm eggs (fig. 3). If these eggs are found, the person should be treated for hookworms.

Question 27. Can these eggs be seen by the naked eye?

No; they are too small to be seen by the naked eye. But when the specimen is looked at under a strong magnifying glass (called a microscope, because it aids us to see small things) the doctors can see the eggs.

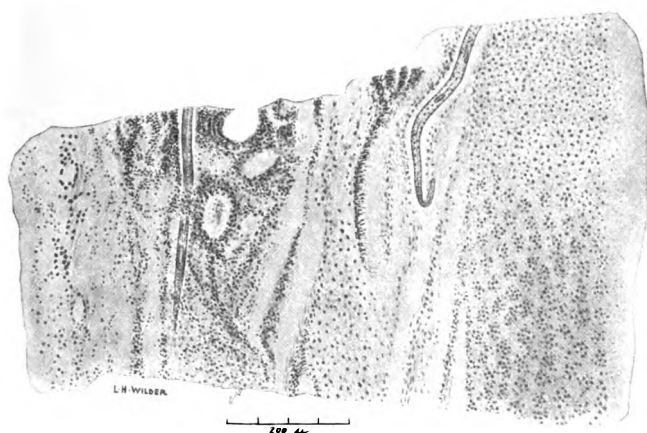


Figure 13. Here we see two young hookworms in the larynx (Adam's apple). The worms pass to the intestine (bowels) and again take food and grow, shedding their skin two more times.

Question 28. What is the State Board of Health?

This is a committee of doctors paid by the State to prevent the spread of disease.

Question 29. Is it necessary to pay for having the specimen examined by the State Board of Health?

No; the examination is made free of charge. All you have to do is to give the specimen to your family doctor (physician) and ask him to have the examination made. He may, however, ask you to furnish a "mailing case" (which will cost about 15 to 25 cents) in which to send it, and he may ask you to pay the postage.

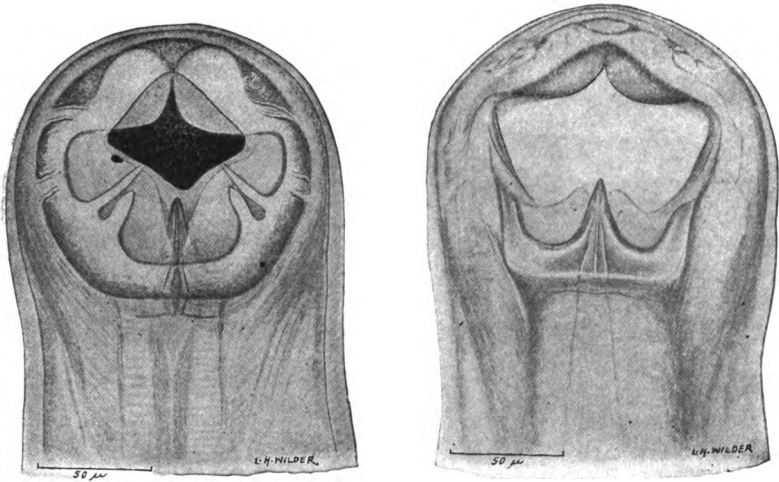


Figure 14. Head of a hookworm, greatly magnified with a microscope. We are looking directly into the mouth and see (above) the two jaws, and in the middle of the picture we see a hollow tooth, somewhat similar to the poison-fang of a snake.

Figure 15. This is the same head as shown in figure 14, but at a deeper level. The two jaws are seen above and the fang-like tooth in the middle.

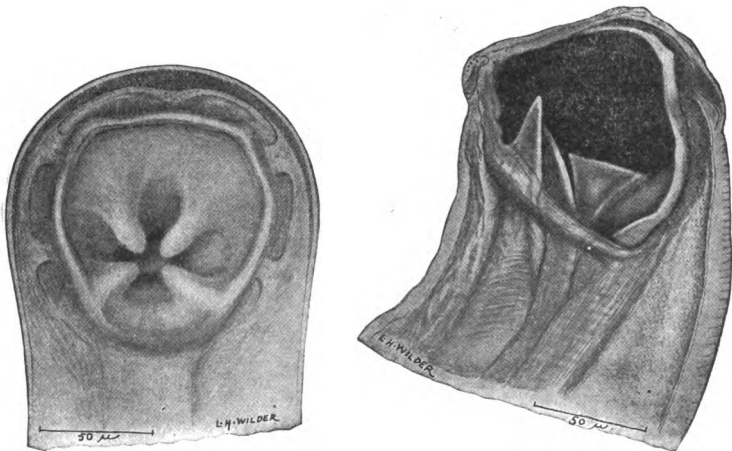


Figure 16. This figure shows the entrance into the esophagus or gullet, which is guarded by four cutting blades.

Figure 17. A side view of the head, greatly magnified and showing the mouth cavity (the very black portion), into which extend the prominent fang-like tooth and the sharp lancets.

Question 30. Can you make a mailing case at home?

It is best not to try to do so, as the Post Office laws are very strict. Either buy a mailing case or write to the State Board of Health to send you one.

Question 31. What should be sent with the specimen?

Care must be taken to write on a paper the name, age, sex, and race (white or negro) of the person from whom the specimen comes, and also the name and address of the family physician, and to send this paper (but no other writing) in the mailing case.



Figure 18. This shows the head of a hookworm as the parasite is feeding, attached to the wall of the bowels.

Question 32. If a person has hookworms, should he try to doctor himself?

NO. He should be doctored by his family physician, as the size of the dose of medicine depends upon the patient's age and condition, and especially upon the condition of his heart.

Question 33. Is it a good plan to take "patent" or secret medicines for hookworms?

NO. Much harm may be done by taking secret and "patent" medicines, especially those advertised as "sure cures." It is always best to go to the family physician, who can study the patient and can decide what medicine and how much of it should be used.

Question 34. Suppose the family physician laughs when asked if you have hookworm disease, and tells you that there is no such sickness?

No doctor who is fit to be our family physician will do that. If any doctor does do that, it is time for us to select another.

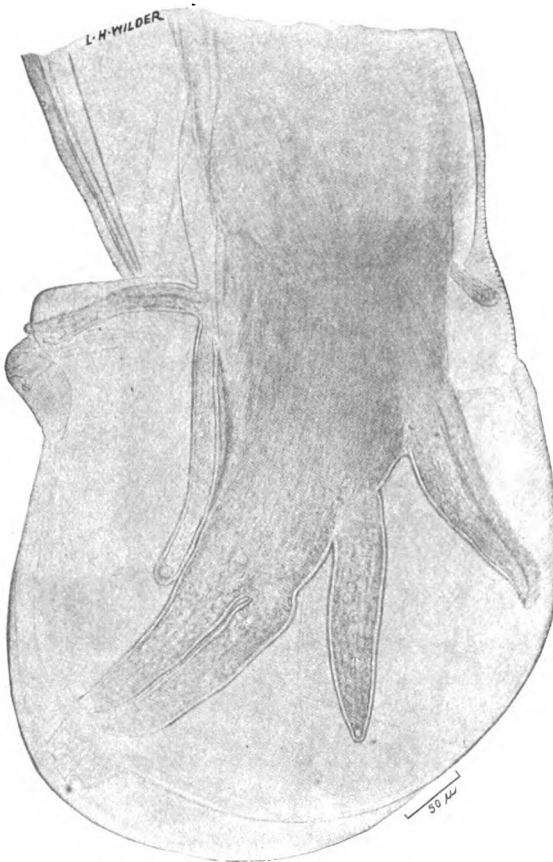


Figure 19. Side view of the umbrella-like expansion of the tail of the male hookworm, supported by muscular rays, similar to the ribs of an umbrella. The first worm ever described as belonging to the hookworm group happened to have these rays bent like hooks, and they were first thought to be hooks. This is the origin of the name "hookworm."

Question 35. For what is hookworm disease frequently mistaken?

For malaria. Many cases called "pernicious or chronic malaria" are in reality cases of hookworm disease.

Question 36. If hookworm disease remains untreated, what may result?

A person with severe hookworm disease may become a "dirt-eater" in case he is not treated. Many persons die as a result of the infection. Some persons remain weak and sickly for years without knowing the cause; their strength (vitality) is reduced and if they are taken sick from some other disease, such as consumption or pneumonia, they are more liable to die than if they were not weakened by the hookworms. Some persons do not suffer any, but they may spread the disease to other people; such persons are called "carriers."

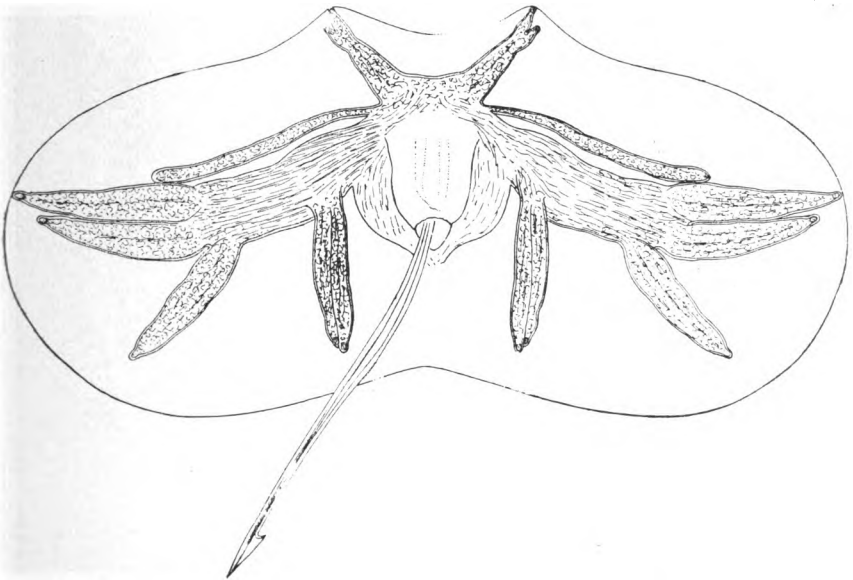


Figure 20. View of the umbrella-like expansion, spread out flat and showing the arrangement of the "rays."

Question 37. Does a person ever outgrow hookworm disease?

Yes. The worms may live certainly for six and a half years and probably for ten or twelve years. If no new infection occurs, the patient will gradually improve in condition as the worms die.

Question 38. How common is hookworm disease?

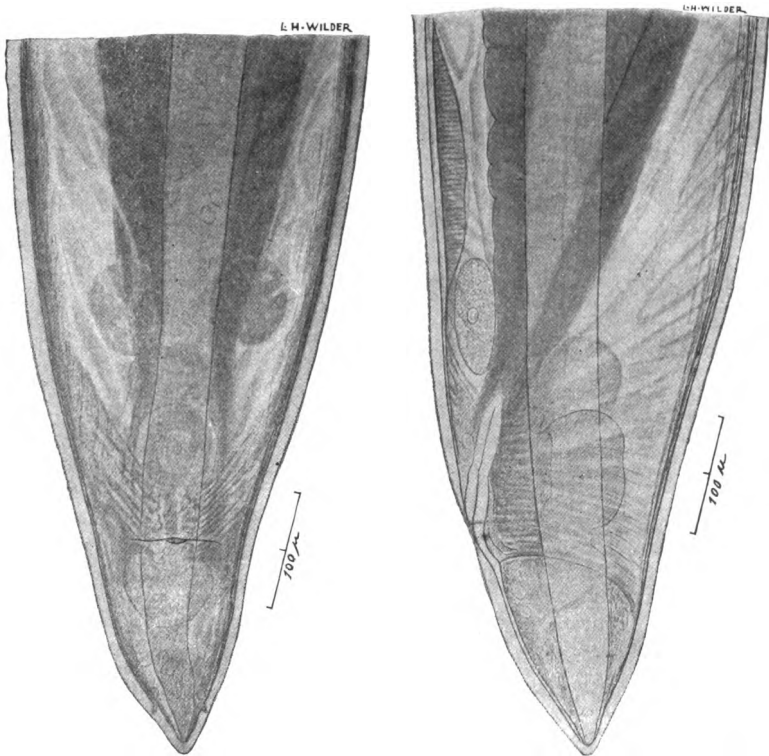
Its frequency varies in different places. In some schools five to nine pupils out of every ten have the worms. In the cotton mills probably one person out of every four is infected.

Question 39. Is the paleness of the cotton-mill people due to hookworms?

Yes, as a rule.

Question 40. What is a dirt-eater?

A dirt-eater is a person who has an unnatural appetite, and on this account eats clay, sand, plaster, soot, wood, cloth, or other things not intended for food.



Figures 21 and 22. Ventral view (fig. 21) and side view (fig. 22) of the tail of a female hookworm.

Question 41. Is dirt-eating the cause of hookworm disease?

It is the result of the disease, not the cause.

Question 42. Can dirt-eating be cured?

Yes, very easily; by curing hookworm disease.

Question 43. Can dirt-eating be prevented?

Yes, very easily ; by preventing soil pollution and thus preventing ground-itch and hookworm disease.

Question 44. How can hookworm disease be prevented?

By building good privies and keeping them clean. Not only should every house have a good privy or closet, but churches and schools also should be provided with them.



Figure 23. This is an extremely poor privy, from which soil pollution is being spread by chickens and swine. This is an altogether too frequent sight on our farms. Flies can breed in the filth and carry it, with disease germs, to the food. No farm with a privy of this kind should be permitted to sell milk.

Question 45. Is there a privy in your yard?**Question 46. Is there a privy at your school?**

Question 47. Is there a privy at your church?

Question 48. How should a privy be built?

There should be a pail, or a barrel, or a tub, or a water-tight box under the seat (fig. 25), and the privy should be closed in back so that chickens, hogs, and dogs cannot reach the discharges.

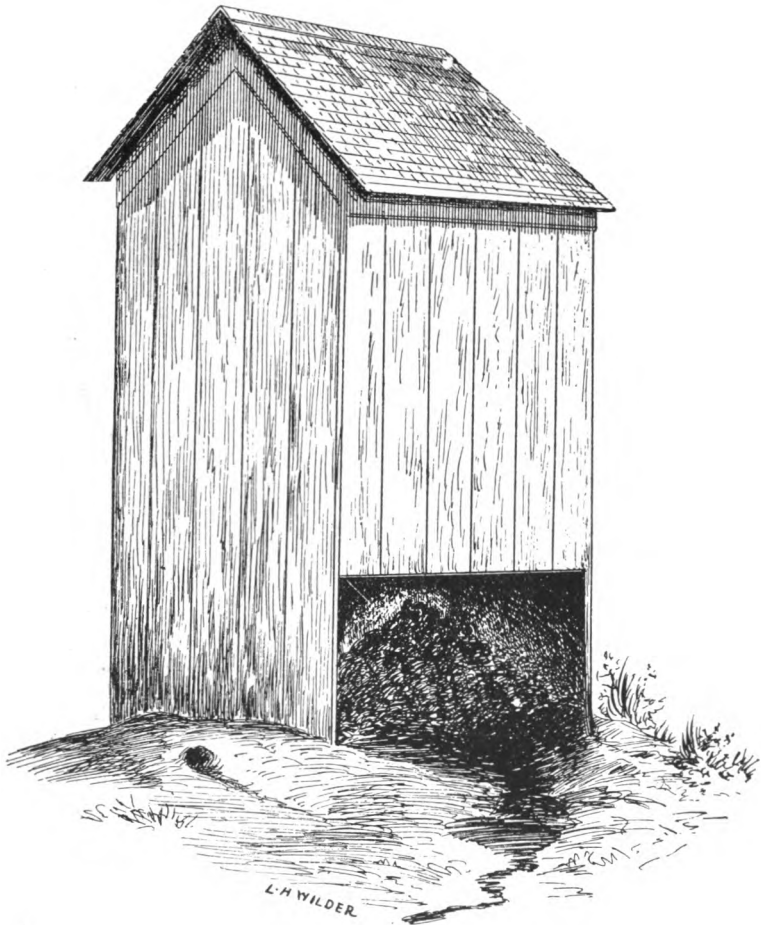


Figure 24. This is the usual style of privy found on farms and in villages. Soil pollution is spreading. Flies breed here and spread disease. Not only can hookworms spread from such a privy, but typhoid fever and other diseases may spread from it. No farm with a privy of this kind should be permitted to sell milk.

Question 49. How can flies be kept away from the tub?

By pouring some fluid known as disinfectant¹ into the tub. Or

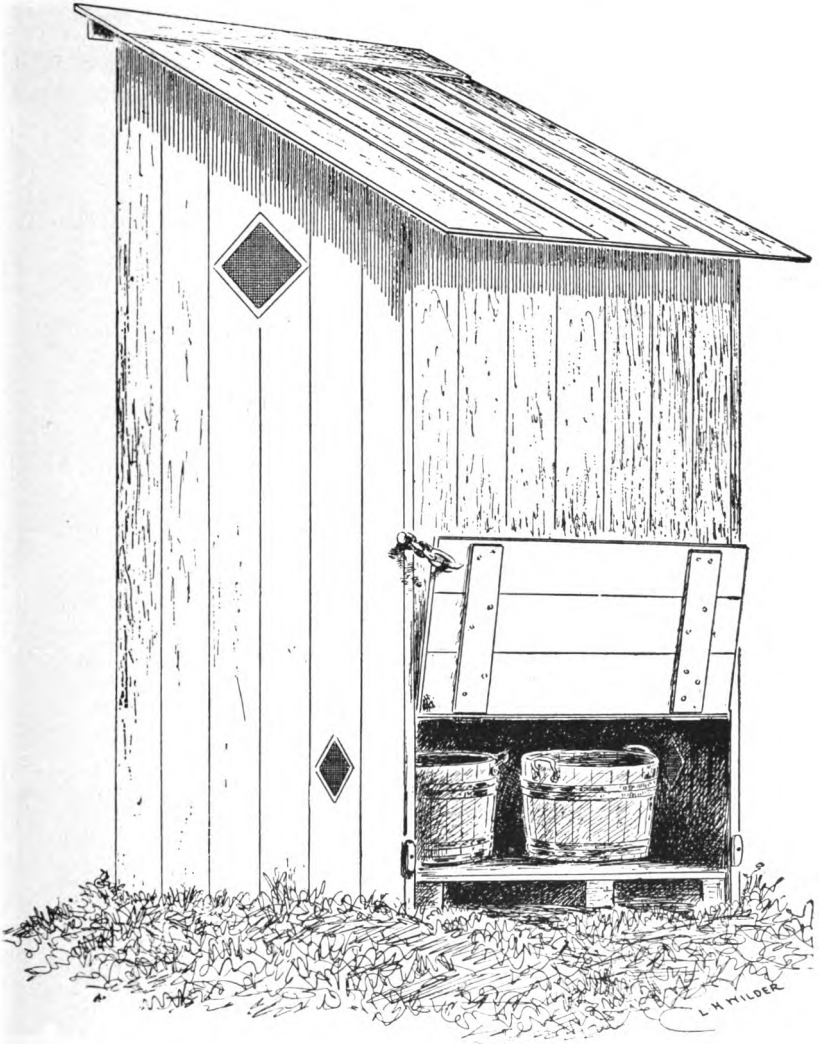


Figure 25. This shows a sanitary privy, designed to prevent the spread of disease. If a privy of this type were built on every farm and in every yard in villages, and if this privy were used by all persons, typhoid fever, hookworm disease, and various other maladies would almost or entirely disappear.

¹ For parents: Such as 1 part of compound solution of cresol (U. S. P.) to 19 parts of water; ordinary sheep dip also may be used.

some water may be placed in the tub and a cupful of crude oil² may be poured on the water.

Question 50. Why is it dangerous for flies to visit privies?

Because flies may go from the privy to the house and carry filth and the germs of disease to the sugar, butter, bread, meat, and other food.



Figure 26. A sanitary privy very similar to that shown in figure 25.

Let every school boy whose home is not supplied with a water-closet see that his house has a sanitary privy.

² For parents: Kerosene oil will answer the purpose.

Question 51. Is it dangerous to use the human discharges for fertilizer?

It is very dangerous to health to take fresh human discharges from a privy and use the material as fertilizer. Such material is very liable to spread disease. This is especially the case in warm climates.

Some villages have "septic tanks" in which the discharges are kept for a number of hours and allowed to ferment and to become fluid. But even then they may contain disease germs, and it is best not to use them as fertilizer or carelessly dispose of them unless they are disinfected. If discharges from such tanks are used as fertilizer, it is best not to put them on fields used for growing vegetables which are not cooked before being eaten—as celery, etc.

Question 52. How often ought a privy to be cleaned?

Once or twice a week, as a rule. Then a fresh layer of sand or dirt should be put into the pail, box, or tub.

Question 53. What should be done with the discharges?

They should be buried not less than two feet deep, down hill from and certainly not nearer than 300 feet to any well or spring. Or they should be burned. Or they should be put into a pit, protected against flies, and here permitted to ferment.

Question 54. Is it safe to throw the discharges on the manure pile?

No; that is very, very dangerous, because of the danger of spreading disease to people (especially by flies, which breed in the manure) as well as to cattle and hogs.

Question 55. What disease may be spread to cattle and hogs from human discharges?

If a person has certain tapeworms, and cattle or hogs eat the discharges from that person, these animals contract diseases known as "beef measles" and "hog measles." If the meat of such animals is eaten people catch tapeworms.

JUN 3 1912

NO 248
1057

(PUBLICATION No. 2)

THE ROCKEFELLER SANITARY COMMISSION
FOR THE
ERADICATION OF HOOKWORM DISEASE

Report of Scientific Secretary

OFFICES OF THE COMMISSION
WASHINGTON, D. C.
1911

THE ROCKEFELLER SANITARY COMMISSION

FOR THE

ERADICATION OF HOOKWORM DISEASE

FIRST ANNUAL REPORT OF THE SCIENTIFIC SECRETARY
FOR THE YEAR ENDING JANUARY 25, 1911

OFFICES OF THE COMMISSION

WASHINGTON, D. C.

1911

WASHINGTON, D. C.
PRESS OF JUDD & DETWEILER, INC.
1911

**FIRST ANNUAL REPORT OF THE SCIENTIFIC
SECRETARY**

OF THE

ROCKEFELLER SANITARY COMMISSION

FOR THE

YEAR ENDING JANUARY 25, 1911.

Herewith I have the honor to submit a general report covering the time from the date of the organization of the Commission to January 25, 1911.

In my work this past year, Surgeon-General Wyman has supported me in every way that he could possibly do so legally. I have in fact continued the same work that I have been doing for eight years past, but more intensively, due to combining the advantages of Scientific Secretary to this Commission and Professor of Zoology of the Public Health and Marine Hospital Service.

Addresses and clinics.—Since the organization of the Commission I have attended a number of medical meetings in different States, and have taken advantage of these trips to give addresses before various non-medical, especially educational, organizations. In all I have given 122 addresses and clinics. The traveling expenses involved in 87 of these have been paid by the Commission. The distribution of the addresses by States and organizations is seen from the following table:

Addresses before—	Medical and public health meetings, professional.						Educational or scientific meetings.							Other meetings.			
	National or interstate associations.	State associations.	District associations.	County or local associations.	Medical or nurses' schools.	National or interstate associations.	State teachers' associations.	District teachers' associations.	Teachers' clubs.	Colleges and universities.	Normal schools.	Other schools.	Public audiences.	National or interstate welfare associations.	Clubs.	Miscellaneous.	
Massachusetts						(1)								1			2
Connecticut															(1)		1
New York		(1)		1										(1)		(1)	3
New Jersey															1		2
Pennsylvania																	1
Maryland		1			(1)									(2)			5
District of Columbia	(1)				(5)	(1)			(1)								9
Virginia					2					1	(3)		9(1)				6
North Carolina		(1)		8	3		1	2		2			7		1		32
South Carolina			2	1	4			1								2	17
Georgia	(2)																2
Florida		3															3
Alabama		1		7						1	1						11
Mississippi		1			4												6
Tennessee		(4)		1		2				(1)	2						11
Arkansas				1													3
Texas		(2)			1												3
Missouri	2				2												4
Ohio										(1)							1
Total R. C.	2	7	2	20	16	2	1	3		4	3	1	20	1	2	3	87
Total others	3	8			6	2			1	3	3	2	1	3	2	1	35
Grand total	5	15	2	20	22	4	1	3	1	7	6	3	21	4	4	4	122

Lantern slides.—Lantern slides illustrating the anatomy and life history of hookworms, the insanitary conditions under which the disease spreads, the appearance of hookworm patients, the geographic distribution of the disease, etc., have been prepared. Nine hundred and sixty-eight such slides have been distributed to various State boards of health, and several sets of nearly 60 slides each are kept in stock to loan to medical societies, universities, clubs, teachers' associations, etc.

Microscopic diagnosis.—Before the various State laboratories were equipped for the microscopic diagnosis of hookworm disease, it was necessary for me to make a large number of microscopic examinations for practicing physicians. At present, however, the State facilities for carrying on the work have so increased that I am being gradually relieved of this routine. As a general proposition it seems much better that the State boards should do this work, but I am always at their service in time of emergency.

Correspondence.—The fact that the forces of the State boards of health have been increased has naturally resulted in a gradual decrease in my routine correspondence. This last year, however, the correspondence with physicians has been rather extensive.

Inspections.—During the early years of the hookworm work in this country, it was necessary for me to make inspections of schools, etc., in order to determine the geographic distribution and frequency of hookworm suspects. At present, however, it seems that this work can, at least for the most part, best be left to the State boards of health.

Publications.—Since the organization of the Commission, the following articles on hookworm disease by the Scientific Secretary have been published, and several more are now in press or in manuscript:

STILES, C. W.:

1909*n*. Hookworm disease in its relation to the negro.
[Reprint of Pub. Health Rep., U. S. Pub. Health and Mar.-

Hosp. Serv., Wash., v. 24(31), July 30, pp. 1083-1089.]
 <Indianapolis M. J., v. 12(11), Nov., pp. 482-486.

1909o. Idem <Med. Brief, St. Louis (443), v. 37(11),
 Nov., pp. 647-652.

1909p. Idem <Hering Quart., Batavia, Ill., v. 2(3),
 Nov., pp. 60-65.

(1909t). The treatment of hookworm disease. [Editorial.]
 <Indianapolis M. J., v. 12(11), Nov., pp. 477-478.

1909v. Idem. [Reprint of Pub. Health Rep., U. S. Pub.
 Health and Mar.-Hosp. Serv., Wash., v. 24(34), Aug. 20,
 pp. 1191-1193.] <Ætna Life News, Hartford, Conn. (113),
 Nov., pp. 5-7; editorial, p. 4.

1909dd. Faulty disposal of excreta the chief factor in the
 spread of ankylostomiasis and typhoid. [Abstract of Pub.
 Health Rep., U. S. Pub. Health and Mar.-Hosp. Serv.,
 Wash., v. 24(40), Oct. 1, pp. 1445-1447.] <J. Trop. M.
 and Hyg., Lond., v. 12(22), Nov. 15, p. 347.

1910. Biology of the hookworm. [Secretary's abstract of
 remarks before South. Health Confer., Atlanta, Jan. 18-19.]
 <Med. Rec., N. Y. (2050), v. 77(8), Feb. 19, p. 338.

1910. History and zoölogical aspects of hookworm dis-
 ease. [Read before 1 South. Health Confer., Atlanta, Ga.,
 Jan. 18-19.] <J. Am. M. Asso., Chicago, v. 54(5), Jan. 29,
 pp. 391-392.

1910. Idem. [Secretary's abstract of remarks before
 South. Health Confer., Atlanta, Jan. 18-19.] <N. York
 M. J. [etc.] (1628), v. 91(7), Feb. 12, p. 356.

1910. Idem. [Idem.] <Med. Rec., N. Y. (2050), v.
 77(8), Feb. 19, p. 336.

1910. Soil pollution as cause of ground-itch, hookworm
 disease (ground-itch anemia), and dirt-eating. <Publica-
 tion No. 1, Rockefeller Sanitary Commission for the Eradi-
 cation of Hookworm Disease, Wash., pp. 1-27, figs. 1-26.

1910. Idem. [Reprinted by North Carolina State Board
 of Education.] <Pub. Health Bull. for Pub. Schools,
 Raleigh, pp. 1-27, figs. 1-26.

1910. Frequency of hookworm disease or ground-itch anemia among public-school children in southern Florida. <Pub. Health Rep., U. S. Pub. Health and Mar.-Hosp. Serv., Wash., v. 25(12), Mar. 25, pp. 351-354.

1910. Idem. [Editorial abstract of Pub. Health Rep., U. S. Pub. Health and Mar. Hosp. Serv., Wash., v. 25(12), Mar. 25, pp. 351-354.] <Med. Rec., N. Y., (2058), v. 77(16), Apr. 16, p. 672.

1910. Further observations on soil pollution in the Southern States <Pub. Health Rep., U. S. Pub. Health and Mar.-Hosp. Serv., Wash., v. 25(11), Mar. 18, pp. 328-329.

1910. Hookworm disease in three cotton mills in North Carolina <Ibidem, v. 25(12), Mar. 25, pp. 354-355.

1910. The "Reader" as a possible public-health agency in cigar factories <Ibidem, v. 25(12), Mar. 25, pp. 355-356.

1910. Results of microscopic examination for hookworm disease in a public school in Richmond Co., Va. <Ibidem, v. 25(16), Apr. 22, pp. 505-506.

1910. The sanitary privy <Ibidem, v. 25(17), Apr. 29, pp. 549-552, figs. 1-4.

1910. Hookworm disease (or ground-itch anemia); its nature, treatment, and prevention <Pub. Health Bull. No. 32, U. S. Pub. Health and Mar.-Hosp. Serv., Wash., pp. 1-40, figs. 1-29.

1910. The sanitary privy; its purpose and construction <Ibidem, No. 37, pp. 1-24, figs. 1-12.

1910. Idem. [Reprint.] <Quart. Bull. La. St. Board of Health, New Orleans, Nov. 15, v. 1(4), pp. 8-15, figs. 1-12.

1910. Hookworm disease. [Read before the 34th Ann. Sess. Ark. Med. Soc.] <J. Ark. Med. Soc., v. 7(5), Oct., pp. 127-129.

1910. Address on hookworm disease or uncinariasis. [Read before the State Med. Ass. of Texas, May 12.] <Tex. St. J. of Med., Ft. Worth, v. 6(7), Nov., pp. 160-161.

1910. Discovery, distribution, and consequences of hookworm disease. [Read before symposium on hookworm dis-

ease, Ann. Meet. Tenn. St. Med. Ass.] <J. Tenn. St. Med. Ass., Nashville, v. 3(2), June, pp. 35-36.

1910. Some recent investigations into the prevalence of hookworm disease among children <Proc. Child Confer. for Research and Welfare, Worcester, Mass. (June 28-July 2), v. 2, pp. 211-215.

STILES, C. W., and GARDNER, C. H.:

1910. The practical workings of the "surface privy" and the "lime system" <Pub. Health Rep., U. S. Pub. Health and Mar.-Hosp. Serv., Wash., v. 25(27), July 8, pp. 947-950.

1910. Further observations on the disposal of excreta (second paper) <Ibidem, v. 25(33), Aug. 19, pp. 1137-1140.

1910. Further observations on the disposal of excreta (third paper) <Ibidem, v. 25(50), Dec. 16, pp. 1825-1830.

LUMSDEN, L. L., ROBERTS, N., and STILES, C. W.:

1910. Preliminary note on a simple and inexpensive apparatus for use in safe disposal of night soil <Pub. Health Rep., U. S. Pub. Health and Mar.-Hosp. Serv., Wash., v. 25(45), Nov. 11, pp. 1619-1623, 1 fig.

1910. Idem. [Reprint no. 54,] U. S. Pub. Health and Mar.-Hosp. Serv., Wash., pp. 1-7, 1 fig.

The publications by the Public Health and Marine-Hospital Service are sent out directly from the Surgeon-General's office.

Model privies.—Shortly after the organization of the Commission, I had several model privies constructed, and these have been loaned to a number of organizations for exhibit purposes.

Investigations.—This past year investigations along the following lines in particular have been instituted and are still in progress in connection with the regular work in the Public Health and Marine-Hospital Service:

(a) On the viability of hookworm infection in the egg and larval stages outside the body.

(b) On a comparison of the various drugs used for treatment.

(c) On the safe disposal of night soil.

(d) Statistics of soil pollution on farms.

(a) **Viability experiments.**—A series of parallel experiments is being conducted at the Hygienic Laboratory at Washington, D. C., and at the U. S. Marine-Hospital at Wilmington, N. C.

At Wilmington, in coöperation with Surgeon C. H. Gardner, I have reached the following results:

(1) It is not safe, at present, to assume that the sand under and around a privy is entirely free from hookworm infection for about 5 months (151 days) after the privy was last used.

(2) After about 4 months (120 days), however, the infection may be very greatly reduced, and possibly in some instances entirely killed.

(3) After about 5 months (150 days) in sand, live *Ascaris* embryos in the eggs may be found, even when all the hookworm larvæ observed are dead. *Ascaris* eggs, apparently alive and normal, were found after 156 days.

(4) Hookworm eggs may be identified in sand cultures 117 days old.

(5) When fecal material is subjected to decomposition in water for 70 days (namely, about 2 1/3 months), the mass of hookworm eggs die, but a few can survive.

(6) No hookworm egg has as yet been found alive in feces subjected to decomposition for 117 to 149 days, namely, about 4 to 5 months.

(7) It seems very probable from present data that, under conditions under which our observations have been conducted, if fecal material containing hookworm eggs is subjected to decomposition in water for about three months, all hookworm infection will be dead. If this probability is confirmed by further observations, then, viewed from the

standpoint of hookworm infection alone, the effluent from the L. R. S. sanitary privy, described in Public Health Reports, 1910, pages 1619-1623, should be stored 3 months before being used as fertilizer.

(8) In feces allowed to decompose in water, *Ascaris* eggs resist the decomposition better than do the hookworm ova. At the end of about 4 months (117 to 121 days), however, at least 80 per cent of the *Ascaris* eggs appear to be dead.

(9) The action of chloride of lime in the strength of approximately one-fourth pound to 10½ quarts of water for 22 to 40 hours does not kill hookworm eggs.

(10) If fly-blown fecal material is buried under 6½ inches of sterilized sand, flies (*Ophrya leucostoma*) will crawl through the sand and complete their development.

(11) If fly-blown fecal material is buried under 17 inches of sterilized sand, flies (*Sarcophaga* sp.) will crawl through to the surface and complete their development.

(12) When fly-blown fecal material was buried under 48 inches of clean (unsterilized) sand, flies (*Musca domestica*) issued from the surface.

(13) When fly-blown fecal material was buried under 72 inches of clean (unsterilized) sand, flies (genus and species undetermined) issued from the surface.

The observations reported on *Ascaris* and flies have an intimate bearing on the hookworm and typhoid problems, because the preventive measures (as respects soil pollution) aimed against any one of these infections will inhibit the others also. Accordingly, it is necessary to adopt uniform measures that will be satisfactory in fighting all of the soil-pollution diseases and pests.

The Washington experiments are not yet ready for publication.

(b) **Experiments with drugs.**—Dr. W. H. Shultz, one of the pharmacologists of the Hygienic Laboratory, has begun an extensive series of experiments involving a comparison of all the different drugs and methods that have been recommended in treating hookworm disease. It will be some months before his report will be completed.

(c) **Disposal of night soil.**—The proper disposal of human excreta is recognized by sanitarians as the most important single measure needed to prevent the spread of typhoid fever, hookworm disease, the dysenteries, and certain other widely prevalent diseases. In the campaign against hookworm disease it is impossible to emphasize this point too strongly.

There has been some difference of opinion as to just which of several methods is the best one to adopt, and on this account it has been considered wise to restudy the subject in conjunction with the investigation of this subject in the Hygienic Laboratory of the Public Health and Marine-Hospital Service. The status of the problem may be summarized briefly as follows:

The privy is the great sanitary problem of the open country and non-sewered villages. As it is not known which persons in a given community are carriers of typhoid, amœbæ, hookworms, Cochín-China diarrhœa, *Ascaris*, etc., it is necessary from the public-health point of view to impress upon the public the thought that all fresh human feces should be accepted as dangerous and should be treated as if they were actually a virulent poison. To adopt any other course is to run a risk of unnecessary sickness and death, especially among children. To bury the night soil without first safeguarding it may result in disease; to permit a continuation of the use of fresh night soil as fertilizer, in view of present-day knowledge, is to permit a custom endangering life. Burning or boiling the human excreta is at present the most ideal plan; but, while feasible in many instances, it is not of universal feasibility. Still, we must not close our eyes to the fact that in the present absence of definite knowledge regarding the viability of certain infections (as amœbæ, for instance), every other plan (disinfectants included) must for the present be accepted as a compromise.

The best-known compromise (the sewer) is not applicable to the open country; even as this system is used (and abused) in cities, we should recall that our knowledge re-

garding the possible distribution of zoöparasitic diseases by the sewer system is very rudimentary. The surface privy is a distinct improvement over none at all, but is unwarranted in view of present-day knowledge. The so-called "pail system" (including any water-tight receptacle, as a can, tub, or barrel) is the least that can possibly be demanded. Some safeguarding material should be used in this pail. If dry earth, ashes, or lime is used, the entire privy should be made rigidly fly-proof; if a fluid system is used, the screening is not quite so necessary, and thus a less expensive privy can be built. It remains to find a system of safeguarding which will be practical as well as theoretically not too inefficient. All systems have their advantages and their disadvantages; none is perfect.

The great practical disadvantage of the "dry" systems is that they call for coöperation from persons (children and many adult persons) whose coöperation cannot be relied upon; given the lack of coöperation, even in a relatively small percentage of the population, and the advantages of the system are far less than popularly supposed, for flies and worms can develop and come to the surface, and thus continue to spread infection. If the dry system is adopted, the night soil should be subjected to heat in order to kill infection. The great practical advantage of the "dry" system lies in the fact that so many people already know about it. It is a great advance over the surface privy.

In dealing with rural localities and many towns, one of the greatest obstacles to be considered is the widespread desire to use the night soil as a fertilizer. Whatever our views on this subject may be, we must face the fact that it is a deeply rooted custom among our people which it may take a generation to eradicate. One great advantage of the "wet" system is that it seems to offer a promise that a means may be found whereby we may still retain whatever value there may be in the night soil as fertilizer, and at the same time do away with the risk involved in this custom.

Thus making an economic concession to farmers, we may still avoid the risk of estranging a large number of them from necessary sanitary improvements. To make it economically worth while to be sanitary in one's habit is one of the keynotes of sanitary advance.

An advantage of the water-kerosene method is that it can be installed with so little trouble and with so little change in the present privies. The only really necessary additions to the present surface privy are a platform under the seat, a receptacle such as a tub or a barrel under the seat, and the necessary barrels for fermentation, or an iron pail for boiling.

Surgeon Gardner and I have observed the practical workings of the so-called "surface privy open in back," which is the most commonly used system in the United States, and we find even greater arguments against it than have been advanced heretofore. We admit its superiority to promiscuous defecation, but otherwise we have for it only words of condemnation.

Drs. Lumsden, Roberts, and I have during the past year constructed an apparatus which we believe overcomes all theoretical and practical objections heretofore raised to the wet system. It is inexpensive, easily constructed, easily managed, satisfactory in practical use, almost without odor, and at an expense of \$1.50 to \$3.00 can be added to the present surface privy without rebuilding the latter. This apparatus has been in use in the Hygienic Laboratory for six months. Surgeon Gardner and I now have a number of them in practical use in a cotton-mill village, and also at the Marine-Hospital at Wilmington; the State board of health is testing the apparatus in Virginia, and several other boards of health have signified their intention to try it. The description of the apparatus as published by Lumsden, Roberts, and myself is as follows (see fig. 1):

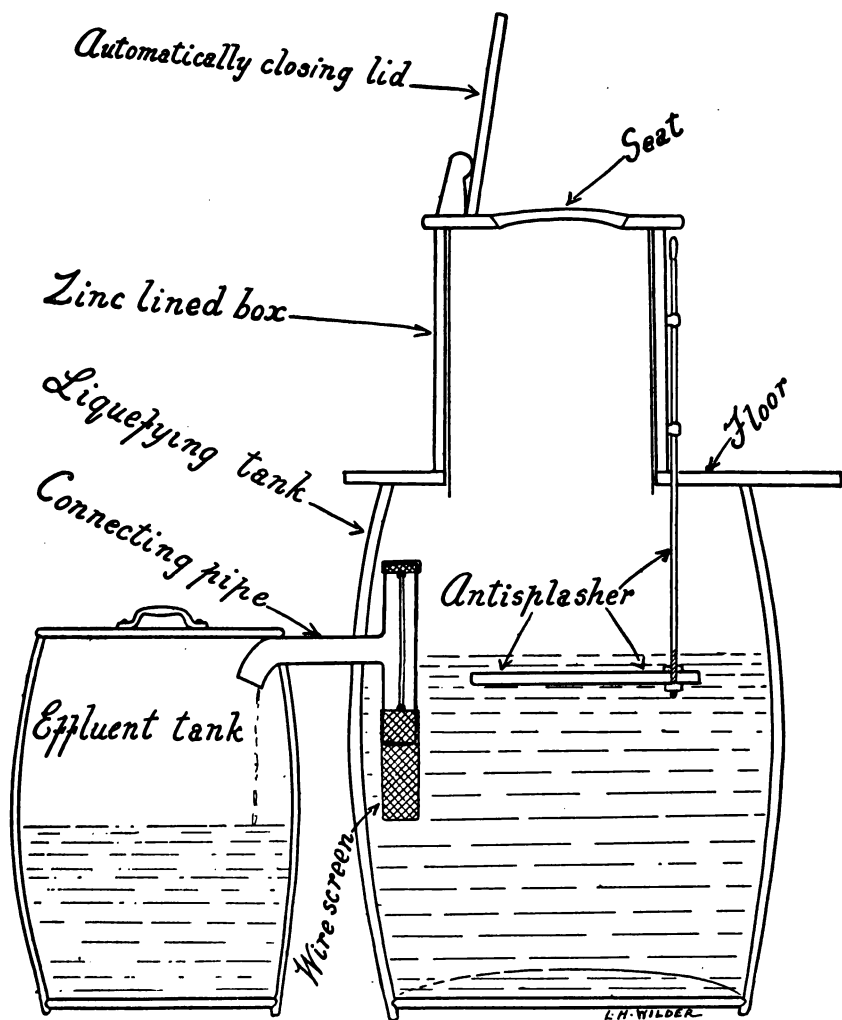


FIG. I.—AN L. R. S. PRIVY

Construction.—The apparatus under consideration consists of the following parts:

1. A water-tight barrel to be used as a liquefier.
2. A covered water-tight barrel, can, or other container to receive the effluent.
3. A connecting pipe about $2\frac{1}{2}$ inches in diameter, about 12 inches long, and provided with an open "T" at one end, both openings of the "T" being covered by wire screens.
4. A tight box, preferably zinc lined, which fits tightly on the top of the liquefying barrel; it is provided with an opening on top for the seat, which has an automatically closing lid.
5. An anti-splashing device consisting of a small board placed horizontally under the seat and one inch below the level of the transverse connecting pipe; it is held in place by a rod, which passes through rings or eyes fastened to the box, and by which the board is raised and lowered.

The liquefying tank is filled with water up to the point where it begins to trickle into the effluent tank. As an insect repellent a thin film of some form of petroleum may be poured on the surface of the liquid in each barrel.

Practical working of the apparatus.—When the privy is to be used the rod is pulled up so that the anti-splashing board rises to within about one inch below the surface of the water. The fecal matter falls into the water, but the board prevents splashing, and thus meets one of the greatest objections thus far raised to the wet system. After defecation the person sinks the anti-splashing board by depressing the rod, and the fecal matter then floats free into the water. We are now working on an improvement whereby the rod will connect with the automatically closing lid, and the anti-splashing board will rise and sink as the lid is opened and closed.

Although some of the fecal matter floats, it is protected both from fly-breeding and fly-feeding in the following

ways: First, by the automatically closing lid; second, by the water; third, by the film of oil, and fourth, for additional safety, the apparatus should be located in a screened place. The film of oil also prevents the breeding of mosquitoes in the barrel. Accordingly, so far as the privy as a breeding or feeding place for flies and mosquitoes is concerned, the model in question completely solves the problem.

The fecal material becomes fermented in the water and gradually liquefies; the addition of excreta naturally raises the level of the liquid, and the excess flows into the effluent tank, where it is protected from insects by the cover and by the film of oil. This effluent may be allowed to collect in the tank until it reaches the level of the connecting pipe, when it may be safely disposed of in various ways to be discussed later.

From July 12 to October 26 there were 246 defecations (with urination) into the model in question, making about two and one-third defecations a day. The effluent has amounted to about twelve gallons of a manageable fluid. It has not been found necessary to add water to the liquefying barrel since the apparatus was put into operation.

Although the period in question included the hottest part of summer, the odor, when compared with that of the average privy, has been negligible.

It is thus seen that this device appears to meet the following requirements:

1. It solves the fly and mosquito problems, so far as the privy is concerned.
2. It liquefies fecal matter and reduces its volume so that it may be safely disposed of more easily and cheaply than night soil.
3. It reduces odor.
4. It reduces the labor of cleaning the privy and makes this work less disagreeable.
5. It is of simple and inexpensive construction.

The effect of the fermentative changes in the apparatus upon the viability of typhoid bacilli and hookworm eggs has not been determined, but other experiments tend to show that under such conditions the vast majority of typhoid bacilli and of hookworm eggs introduced would die within six weeks to two months' time. While the time of storage can be prolonged according to the capacity of vessels provided for the purpose, we believe at present that it is safer and more practical not to depend upon storage alone to destroy infectious organisms in the effluent, but to consider the effluent infectious and to dispose of it accordingly.

Disposal of effluent.—(1) Heat: If a suitable (metallic) vessel is provided to receive the effluent, a fire may be built under the vessel and the effluent heated to boiling; or if a wooden or concrete effluent tank is used, the effluent may be transferred to some other vessel for boiling.

After boiling, the fluid may be safely used for fertilizer under any conditions.

Heat disinfection is the only measure which can today be recommended unreservedly.

(2) Burial: Burial will unquestionably decrease the dangers of spreading infection, but in the present state of our knowledge this method of disposal cannot be relied upon as safe. If burial of the effluent is practiced, the fluid should be disposed of not less than 300 feet from and down hill from any neighboring water supply, and not less than 2 feet underground, and then only provided the soil itself is a good filter. Burial in a limestone region may contaminate water supplies miles away.

(3) Chemical disinfection: Chemical disinfectants, such as chlorinated lime and certain coal-tar derivatives, have the great advantage of cheapness and can be relied upon to destroy pathogenic bacteria. Our knowledge regarding the action of chemical disinfectants upon the eggs and spores of the various animal parasites is at present very rudimentary, but so far as results are known their practical use does

not seem to be so efficient in the destruction of the zoöparasitic as of the bacterial infectious organisms. Therefore, pending further investigations, the use of chemically treated excrement as fertilizer should not be regarded as unqualifiedly safe.

(4) Chemical disinfection with subsequent burial: Inasmuch as chemical disinfection can be relied upon to destroy pathogenic bacteria, and inasmuch as burial greatly reduces the danger from animal parasites, a suitable combination of the two methods (chemical disinfection and burial) can be used with reasonable safety.

(5) Sewers: In partially sewered towns the effluent from these privies may be emptied into the sewers. If conditions are such that the addition of this material to the sewage is dangerous, then the entire sewage system needs correction.

Paper.—Only toilet paper so far has been used, and the septic action seems to digest it. Other experiments indicate that newspaper would be disposed of by septic action in the tank, but perhaps some increase in the size of the tank would be required.

Cleaning.—Although no water has been added since the model was put into operation, the contents of the liquefying tank have remained fluid, and it is probable that in a tank having the capacity of an oil barrel the amount of sludge from the dejecta of a family of five people would not be sufficient to require the cleaning of the liquefying tank oftener than once in six months to a year.

Further experiments.—At present our studies are taking the following general directions:

While the barrel as the liquefying tank doubtless will be found to be the most feasible in many localities, it seems probable that tanks made of concrete or other durable material will be more satisfactory in certain instances, and we are now having both concrete and iron models built.

We are also planning the construction of a series of privies of this type, all of which shall connect with a common effluent pipe so as to have one common effluent tank. A

system of this kind appears to be of special applicability to small villages, such as cotton-mill settlements. The effluent tank would be at the lower end of the row, and should be attended to by the proper authorities.

A third line of study is being made with a view of determining the possibility of utilizing safely the effluent for economic purposes. The effluent tank can be filled with gravel and soil, and possibly some plant may be found which will be able to grow in this material, perhaps thus safely utilizing the fecal material as fertilizer. If a suitable plant can be found, it is clear that the labor of disposing of the effluent will be eliminated; and, if the plant is of economic value—one, for instance, which could be used as food for live-stock—an additional inducement can be offered to the farmer to live a more sanitary life.

(d) **Statistics on soil pollution.**—During the past year I have gathered statistics as to the privy conditions surrounding 4,825 American farm homes, located in six different States, and I find that 2,664, or about 55 per cent of them, have no privy of any kind. Of 2,499 homes tabulated as occupied by whites, 35.2 per cent have no privy, and of 2,326 houses tabulated as occupied by negroes, 76.8 per cent have no privy.

These shocking sanitary conditions under which so many American rural families are living necessarily increase the cases of sickness and death, especially among the women and children, and they decrease the efficiency and laboring capacity among the men.

The fact that the sanitary conditions surrounding the negroes are so much worse than those surrounding the whites calls for very serious consideration, for it involves not only the health, efficiency, and progress of the negroes themselves, but of the whites also. So long as the negro continues to live as he is living at present in the rural districts, his home will remain a reservoir from which disease may spread to the whites, and the white man owes it to his own race that he lend a helping hand to improve the sani-

tary surroundings of the negro. One way this can be done is by obtaining support for instruction in hygiene in negro schools. Another way is by teaching the white landlord the rudiments of hygiene.

Statistics of hookworm carriers.—I take the liberty of inviting attention to the important fact that numerous persons show hookworm infection, but apparently no resulting symptoms. This point has already been misinterpreted by a number of physicians, and is open to serious misinterpretation by the laity.

It should be recalled that a similar condition obtains in typhoid fever, and in other diseases, so that hookworm disease does not form an exception in this respect.

When a person has typhoid infection, without typhoid symptoms, he is known as a "typhoid carrier," and he is recognized as a dangerous element in spreading the disease. In uncinariasis a person who shows an infection, without showing symptoms, is known as a "hookworm carrier." These "carriers" probably outnumber the "patients," and are, from the public-health point of view, very dangerous as spreaders of the disease.

Plans for the coming year.—This coming year I hope to devote less time to lecturing before local audiences and more time to experimental study. For the immediate future I shall concentrate my work on problems of immediate practical importance, especially on viability experiments and the sanitary privy, postponing studies on the more academic questions until later.

THE ROCKEFELLER SANITARY COMMISSION
FOR THE
ERADICATION OF HOOKWORM DISEASE

Report of Administrative Secretary

OFFICES OF THE COMMISSION
WASHINGTON, D. C.

1910

THE ROCKEFELLER SANITARY COMMISSION

FOR THE

ERADICATION OF HOOKWORM DISEASE

ORGANIZATION, ACTIVITIES, AND RESULTS

UP TO DECEMBER 31, 1910

OFFICES OF THE COMMISSION

WASHINGTON, D. C.

1910

THE ROCKEFELLER SANITARY COMMISSION

F. T. GATES

Chairman

L. G. MYERS

Treasurer

WILLIAM H. WELCH

SIMON FLEXNER

E. A. ALDERMAN

D. F. HOUSTON

P. P. CLAXTON

J. Y. JOYNER

WALTER H. PAGE

H. B. FRISSELL

J. D. ROCKEFELLER, JR.

STARR J. MURPHY

WICKLIFFE ROSE

Administrative Secretary

811 Union Trust Building

Washington, D. C.

C. W. STILES

Scientific Secretary

24th and E streets N. W.

Washington, D. C.

ORGANIZATION, ACTIVITIES, AND RESULTS UP TO DECEMBER 31, 1910.

The Rockefeller Sanitary Commission for the eradication of hookworm disease was organized October 26, 1909. By informal action of the Executive Committee an administrative secretary was appointed in December, 1909. On January 8, 1910, offices were opened in the Union Trust Building, in Washington, D. C., and the more definite organization of the work was begun.

I. The work to be done.—The Commission had been created for the purpose of eradicating hookworm disease. To do this involved undertaking three definite tasks: To determine the geographic distribution of the infection and to make a reliable estimate of the degree of infection for each infected area; to cure the present sufferers; and, finally, to remove the source of infection by putting a stop to soil pollution.

II. Organizing the agency to do this work.—The State was adopted as the unit of organization and of work. It was regarded as fundamental in the interest both of economy and of efficiency that the work be done as far as possible through existing agencies. Each State has its own system of public health, its own system of organized medicine, its own organized public press, its own system of public schools—these four fundamentals and a host of minor agencies which can be used to advantage in educating the people. These are established institutions rooted in the

life and traditions of the people; to enlist these agencies in the accomplishment of the task is to insure the permanency of the work from the beginning.

The eradication of this disease, moreover, is a work which no outside agency working independently could do for a people if it would, and one which no outside agency should do if it could. The economic prosperity of the State, the lives and health of its people, and the education of its children are involved; if the infection is to be stamped out, the States in which it exists must assume the responsibility. An outside agency can be helpful only in so far as it aids the States in organizing and bringing into activity their own forces.

In this spirit the Commission responded to invitations from State boards of health to coöperate in organizing the work in those States in which widespread infection had been demonstrated. The nucleus of this organization comprises:

I. A State Director of Sanitation.—This man is appointed by the joint action of the State public health authorities and the Rockefeller Sanitary Commission. He is a State official, an officer of the State department of health, and is clothed with the powers and responsibilities belonging to such position. He is the organizing and directing head of the whole work for the eradication of hookworm disease in his State, and is responsible for the efficiency of the service. His work is done under the general supervision of the State department of health; he reports quarterly to the State department and through this department to the Commission. These reports are manifolded, bound together, and sent to each man in the service. The admin-

istrative secretary of the Commission is kept in constant touch with the details of the work by correspondence and personal observation.

On this basis a State director of sanitation* has been appointed and the work inaugurated in the following States:

State.	State Director of Sanitation.	Work inaugurated.
Virginia.....	A. W. Freeman.....	February 7, 1910
North Carolina...	John A. Ferrell.....	March 12, 1910
Georgia.....	A. G. Fort.....	April 20, 1910
South Carolina....	J. La Bruce Ward....	May 1, 1910
Tennessee.....	Olin West.....	May 10, 1910
Arkansas.....	Morgan Smith.....	May 10, 1910
Mississippi.....	W. S. Leathers.....	June 1, 1910
Alabama.....	W. W. Dinsmore.....	October 1, 1910
Louisiana.....	Sidney D. Porter.....	November 1, 1910

2. **A field force of sanitary inspectors.**—Under the direct supervision of each State director of sanitation is a force of sanitary inspectors. These inspectors are nominated by the State director of sanitation and confirmed by the joint action of the State department of health and the Sanitary Commission. These inspectors constitute an ambulant service and devote their whole time to work in the field. They are the long arms with which the State director reaches out over the State to determine the geographic distribution and degree of infection; to determine the sanitary conditions responsible for the presence and spread of the disease; to enlist the coöperation of the physicians in curing the sufferers; to provide for the treatment of the indigent; to inspect the schools; to instruct the teachers, enlist the

* The official title varies in some States to conform to State usage.

press, and, by lectures, demonstrations, and personal conference, teach the people the importance of getting all infected persons cured, and how to prevent the spread of the disease by putting a stop to soil pollution.

The sanitary inspectors report daily to the State director of sanitation. For this, and for other reports made at longer intervals, forms are supplied. Each inspector is supplied with microscope, medicine, literature, lantern, and slides. The sanitary inspectors by States are: VIRGINIA, A. C. Fisher, W. A. Brumfield, R. C. Carnal, W. A. Plecker; NORTH CAROLINA, B. W. Page, C. F. Strosnider, C. L. Pridgen; SOUTH CAROLINA, F. A. Bell, Milton Weinberg; GEORGIA, C. E. Pattillo, C. H. Dobbs, P. H. Fitzgerald, S. H. Jacobs, W. C. Thompson, T. F. Abercrombie; ALABAMA, H. G. Perry, John F. Orr, W. W. Perdue; MISSISSIPPI, W. H. Rowan, C. R. Stingily, R. N. Whitfield, J. C. Cully, Robert Rowland; TENNESSEE, T. B. Yancey, Jr., W. M. Breeding, W. J. Breeding, J. M. Lee; ARKANSAS, C. C. Price, J. B. Crawford; LOUISIANA, no appointments made as yet.

3. Laboratory staff.—A definite diagnosis of hookworm disease requires a microscopic examination of the patient's stool. One person can make from twenty to thirty-five such examinations a day. Each State has offered to make these examinations without charge. This requires a State laboratory with microscopes and men enough to examine the specimens that are sent in.

At the beginning of the work each State, except Arkansas, Mississippi, and Tennessee, was maintaining a public-health laboratory with staff and equipment more or less adequate. But, as the influence of the work extends, as larger numbers

of physicians and of people become interested, the work of the State laboratory grows, and calls for a corresponding increase in the staff.

The North Carolina State laboratory, which ten months ago needed no special staff for this service, now has five men devoting their whole time to examining specimens for hookworm disease, and has applied for two additional men to keep up with the work. Virginia has in this service one laboratory man; Mississippi, one; Alabama, two; Georgia, two; Louisiana, one, and South Carolina, one.

This definite organization devoted exclusively to this service is relied upon to enlist in the accomplishment of its task the physicians, the press, the schools, and all forces in the State which may be used as agencies in educating the people.

III. The organization at work.—The work in each State has been directed toward the accomplishment of three definite tasks:

1. **Determining the geographic distribution of the infection and estimating the degree of infection for each infected area.**—The survey to determine the infection is made by counties. The State director of sanitation first makes a preliminary survey to locate the infection and to determine roughly whether it is "heavy" or "light." This is followed later, in connection with the other features of the work, with a survey in detail, which estimates what percentage of the total population is infected. The plans followed in making these surveys vary in details; the essentials are these:

(1) **Personal inspection.**—The State Director, on taking up his duties, goes into the field and makes a tour of personal inspection through those counties in which heaviest infection is suspected. He consults physicians, sees a few of their patients, inspects the children in schools, observes the people along the roads, at railroad stations, in country churches, and in the market places of country towns. His hurried clinical diagnosis he checks up by occasional microscopic examinations.

When in this way he has located a large area showing heavy infection, he creates a sanitary district comprising four or five counties, appoints a sanitary inspector to take up the work in detail in this district, and continues his preliminary survey in new territory. In the end the State director and his inspectors, who are frequently assigned temporarily to this duty, will have made a personal preliminary survey of every county in the State.

(2) **Reports from local physicians.**—The State director sends a personal letter to the physicians of the State, asking each one to report the cases of hookworm disease which he has diagnosed and treated. This letter is persistently followed up. As the physicians learn to recognize and treat the disease, these reports grow in number and in value. Dr. Ferrell, of North Carolina, has received reports of about 8,000 cases treated by physicians in 94 out of the 98 counties in the State.

(3) **Laboratory examinations.**—By systematic planning the laboratory records are made to indicate both distribution and degree of infection. The work done in two States makes this clear:

a. All miscellaneous specimens examined are recorded on the State map, thus showing distribution of infection.

b. Three hundred college students were examined as a body without reference to clinical symptoms; the records were mapped by counties. The results showed infection in 54 of the 98 counties in the State, and showed an infection of 42 per cent for this body of men.

c. The three regiments of the State militia and the coast artillery were examined; specimens were collected from all the men; records were made by counties and results mapped. The records show 1,105 men examined. Percentage of infection for First Regiment, 36.8; Second Regiment, 58; Third Regiment, 32; Naval Reserves, 30. Infection located in 34 counties, and percentage for the company in each county given.

d. Examinations of specimens from all the children in an orphanage gave as result: number of children examined, 96; age, 6 to 18 years; percentage of infection, 54; infection located in 21 counties. Other orphanages and State institutions were examined in like manner.

e. One public school was selected at random in each district in the county and specimens secured from all the children in each school selected. Records were made by schools. The results show an average infection of 82.6 per cent for all schools examined. This result, being based on an examination of children in school, is taken as conservative estimate of the average infection for all school children in the county.

The possibilities of the laboratory as a means of determining distribution and degree of infection are limited only

by our laboratory facilities and our ingenuity in planning and conducting investigations.

(4) **Survey in detail by the sanitary inspectors.**—The sanitary inspector is an indispensable factor in this survey at every point. He aids the State director in making preliminary surveys of new territory; he enlists the coöperation of physicians and gets them to report conditions and cases treated in their practice; he secures specimens for systematic examinations being conducted at the laboratory; and, finally, he completes the work by a survey in detail of the sanitary district to which he is assigned. This detailed work he does not do as a thing by itself and at one time; he does it in connection with his other duties, and prolongs it with many interruptions over a long period of time. Dr. Fisher, the first sanitary inspector appointed, says he thinks he has located every focus of infection in the county in which he began his work last spring, and his knowledge of conditions in the other counties is growing toward complete mastery of his district.

To cover the State in this way will require years; but it will be done.

(5) **Summary of results showing:**

a. Infection in nine States.—Maps 1 to 9 show the results of the survey as made up to December 31, 1910. Infection has been demonstrated in every county marked infected. Heavy infection has been demonstrated in every county in which heavy infection is shown on the map. Where the infection is marked as light, a careful survey has demonstrated a light infection; where only the presence of infection is indicated, the degree of infection has not been determined.

b. Infection in other States.—In addition to the nine States in which the work has been organized, infection has been demonstrated in Florida, Kentucky, Texas, Oklahoma, California, and Nevada. It is reported as heavy and producing great economic loss in the mines of California.

c. Infection in foreign countries.—The Commission is getting information on conditions in foreign countries. In addition to learning what countries are infected, information is being sought on: 1, the geographic distribution of the infection within the country; 2, an approximate estimate of the degree of infection; 3, whether the infection is surface or mine infection; 4, what is being done by private or public agencies to eradicate or relieve it. The investigation is just getting well under way. Maps 10 to 15 show the countries in which hookworm infection has been demonstrated.

2. Getting the sufferers cured.—In getting the sufferers cured the State director and his staff follow three lines of effort: Enlisting the physicians in the accomplishment of the task; getting the people to seek examination and treatment, if needed, for themselves and their neighbors; providing for the treatment of the indigent.

(1) Enlisting the physicians in the work.—The State board of health in each State depends upon the physicians of the State to treat all cases of hookworm disease as it depends upon them to treat other diseases. This is a part of their practice; the State board would not take it from them. The task is enormous; it will require years for its accomplishment. It will be done only by the doctors working intelligently, patiently, persistently, each in his own territory.

There are in the nine States 19,981 physicians. These men are distributed over 415,950 square miles of territory. This disease is new to the profession; when the work began a year ago comparatively few physicians in these States were treating it. One of the definite tasks of the State organizations is to enlist this army of 20,000 men as a permanent working force. This is being done—

a. By bulletins.—Each State board of health publishes and distributes to all the physicians in its State special bulletins and folders on diagnosis and treatment of hookworm disease; it publishes special articles on the subject in its regular bulletin, which reaches all physicians in the State.

b. By letters.—The State director of sanitation makes personal appeal by letter to all the physicians of his State. These vary indefinitely in character, but the end is one—to get the physicians enlisted in the work.

c. By lectures.—The State director and his staff give lectures and demonstrations at the medical colleges, at the meetings of State, district, and county medical societies. Often an entire session at these meetings is given to a symposium on hookworm disease with a clinic as central feature.

d. By personal visits.—The sanitary inspector, on going into a new county, visits personally all the physicians; goes with them in their practice; gives demonstrations in diagnosis and treatment when desired; establishes personal relationships, and makes plans for permanent coöperation in the work.

(2) **Getting the people to seek examination and treatment.**—In Porto Rico it is not uncommon to see from one to two hundred people assembled at an anemia station wait-

ing each his turn to be examined and treated for hookworm disease, or "anemia," as they call it on the island. Many of these people, for whom exertion of any kind is difficult, have walked for miles over rugged mountain trails to see the doctor. They are eager to be treated, because for generations they have known anemia as a dread disease; it has been the scourge of the island. The infection is severe; the people are sick, they know they are sick, and have learned that they can be cured.

In the States the infection is less severe; it is scattered over larger areas; its effects have not been so perceptible to the people. They have taken their anemia, their lack of vitality, their feeling "puny" and "out of sorts," as a matter of course. Those that have been severely sick have been treated for malaria, tuberculosis, dropsy, kidney trouble, chronic indigestion, etc.; but hookworm disease, as a disease, has not been known to the people or to the profession. The announcement that hookworm is prevalent in the States was not taken seriously. Many people resented the suggestion of their being infected and refused to be examined and treated, even when they knew they were ill and when every indication pointed to hookworm disease. But, as the people get possession of the fact that hookworm infection is a reality; that all people are subject to it; that its consequences are serious; they come to look upon it as they have been accustomed to look upon tuberculosis, typhoid fever, or any other serious preventable disease.

To get the facts to the people is one of the definite tasks of each State department of health. This is being done:

a. Teaching the people by demonstration.—The sanitary inspector, on going into a new community, picks out

a few typical cases and treats them as an object-lesson. He calls attention to the more striking symptoms present in these cases; he secures specimens of their stools and exhibits the hookworm eggs under the microscope; he administers treatment and later exhibits the parasites that have been expelled. The recovery which follows treatment and cure speaks its own message. These demonstrations are being multiplied by the physicians who are treating the disease. Thus from small and scattered centers to ever-widening circles the people are being reached by these tangible facts which they can see and understand.

b. Teaching the people by examinations made at the State laboratory.—The examinations being made at the State laboratory are demonstrating that the infection is widespread—much more so than any of us suspected one year ago. The infection has in this short time been demonstrated in 91 out of a total of 100 counties in Virginia; in 97 out of the 98 counties in North Carolina; in 22 out of 43 counties in South Carolina, and these distributed over the whole State; in 108 of the 145 counties in Georgia; in 63 of the 67 counties in Alabama; in Louisiana two months' work has demonstrated infection in 23 parishes; in Mississippi it has been demonstrated in 65 of the 76 counties; in Arkansas, in 20 counties in the southern part of the State, where the survey has been made by personal inspection with microscopic examination; in Tennessee, which has no State laboratory, microscopic examinations by the State director and his staff have demonstrated the infection in 52 of the 96 counties, and these situated in every section of the State.

These examinations being made at the laboratories are

showing also that very many people are infected. The North Carolina State laboratory has just completed an examination of 5,556 people, taken by groups without reference to clinical symptoms. These people are college students, soldiers, orphans, public-school children of all ages and conditions. The records show that of the 5,556 persons, 2,408, or 43 per cent, are infected.

These two groups of facts are growing in volume daily; being the records of microscopic examinations made by experts, their accuracy cannot be questioned. They show that the infection is very prevalent among the people, that all classes of people are subject to it, and that it is distributed over large areas of each of these States; they bring home to the people living in these infected areas the importance to the individual and to the community of having every carrier of infection examined and treated.

c. Teaching the people by examination of the school children.—The people are being led to seek examination and treatment by systematic examination of the children in the schools. The sanitary inspector reaches the schools of a county through the State superintendent of education, the county superintendent, the school boards, and principals. On going into a school he makes a clinical examination of all the children, keeping a record of those that show clinical symptoms of hookworm disease. For each of these, notice is sent to the parent and to the family physician, calling attention to the findings and advising that a specimen be submitted to the physician or to the State laboratory for microscopical examination. Many of the inspectors collect the specimens and send them to the laboratory. The parent is given the result of the microscopic examination, and, if

it is positive, is urged to have the child treated by the family physician.

For demonstration and as a check to his own clinical diagnosis, the inspector collects specimens from all the children of a few schools and submits them to the laboratory for examination.

Teachers are becoming active in this work; some of them are becoming expert in recognizing the symptoms of the disease, and urge parents of children showing these symptoms to have them examined. An instructor in one State normal school has examined a large group of student teachers in the institution and is teaching them how to recognize the clinical symptoms and to make the microscopic diagnosis—this with a view to their being able to protect the children in their own schools and to aid in stamping out this disease in the communities to which they may be called as teachers. The teacher thus trained will be the physician's best ally in the work.

d. Teaching the people by example.—The people are being led to seek examination and treatment by the coöperation of public-spirited, influential citizens. The inspectors, on going into a new community, frequently have the coöperation of a group of leading citizens, who ask to be examined and who let the fact be noised abroad. In one State a group of 600 college men submitted to examination and pledged themselves to use their influence each in his own community to get others to be examined and treated. The State universities and a few other colleges of North Carolina, South Carolina, and Mississippi have given their active coöperation and have made their influence felt throughout their respective States.

e. Teaching the people by means of public lectures and the printed page.—In each State the State board of health is disseminating these facts and enlarging the sphere of these influences by means of public lectures and the printed page. The State director and his staff make it a part of the work to give illustrated lectures to teachers, schools, and citizen audiences. In these lectures they use charts, photographs, and lantern slides and supplement these with facts gathered from the whole experience to show as concretely as possible what hookworm disease means to the people of that State in terms of economic loss and human suffering and inefficiency.

In each of the States the State board of health has issued one or more special bulletins showing the effects of the disease, and has distributed these broadcast. Some of the States are distributing in even larger numbers a small folder setting forth in simple language the essential points and giving directions for sending specimens to the State laboratory for free examination. Teachers, physicians, and traveling men are distributing this literature. A physician in Alabama recently reported that he takes a supply of one bulletin with him on every trip into the country. When he meets a child showing symptoms of the disease he hands him a copy, saying, "Show this to your mother and tell her I say I think you have that disease, and that you ought to see your family physician."

The State directors in Virginia, North Carolina, and Mississippi have the public press work well organized and are making systematic use of the county papers as an agency for getting the facts out to the people.

That the people are responding to these efforts is indi-

cated by this record of examinations for hookworm disease made at the North Carolina State laboratory:

Examinations for quarter ending Mar. 31, 1910....	70
“ “ “ “ June 30, 1910....	486
“ “ “ “ Sept. 30, 1910....	2,421
“ “ “ “ Dec. 31, 1911....	4,972

(3) **Providing for the treatment of the indigent.**—Very many of the sufferers from hookworm disease, on account of extreme poverty, are not able to pay for treatment or even for the necessary medicine; and these as a rule are the more severe cases, for poverty is one of the distressing results of the disease. It works slowly through a long series of years, sapping the vitality and thereby destroying the earning power of its victims. Many families in heavily infected areas have never been free from the disease, and are today suffering the cumulative results of conditions that have come down even from preceding generations. To provide for the treatment of these is one of the most stubborn practical problems that the directors of the work are having to meet.

The Florida State board of health is meeting it by paying to the physicians of the State three dollars a case for all cases cured. This payment is made from the public-health fund of the State. The Florida board can do this; its public-health fund is on a mill basis and amounts to about \$75,000 a year. This is not possible with present funds in any other State. In Virginia some voluntary organizations have been formed to raise funds for this purpose. In North Carolina and Virginia the physicians in many counties have agreed by formal resolution to prescribe for hookworm dis-

ease free to the poor, and the women's betterment associations in these counties in North Carolina have agreed to supply the funds for the medicine. Cotton-mill owners in some cases and in others public-spirited citizens have provided medicine for the indigent. In Arkansas, county organizations formed for the eradication of hookworm disease undertake to provide for treatment of all who need the aid. All these efforts help; but these agencies are not permanent and cannot of themselves meet the situation.

In Mississippi a free dispensary has been opened at Columbia for the treatment of hookworm disease in Marion county. The county board of supervisors recently made an appropriation from the county funds for the purpose of supplying the drugs; the county health officer provided four rooms with hall and lavatory; the Commercial Club of Columbia supplied the rooms with beds; the local physicians offered coöperation in giving treatment. The dispensary is running at its full capacity and hundreds are being turned away for lack of facilities. This is the most promising move that has been made in the direction of supplying treatment for the indigent.

(4) **Results.**—For summary of activities and results see Tables 1 and 2.

a. Table 1 shows the number of physicians in the State; what has been done to enlist them in the work; the estimated number treating the disease. The physician once enlisted is in the work for life.

b. Table 2 shows examinations made and cases treated. By devoting itself directly to the treatment of cases the State organizations could have made a definite record of a

much larger number of cases treated; enlisting physicians now insures for the future multiplication of results.

c. The largest result achieved this year does not appear in the tables, namely, public sentiment created.

3. **Putting a stop to soil pollution.**—The final task in this work is to stamp out hookworm infection by putting a stop to soil pollution. The work is one of education and will require years for its accomplishment. Two lines of work are now in progress:

(1) **Sanitary survey.**—The State organization is conducting a sanitary survey to determine the existing conditions responsible for the presence and spread of the disease. The sanitary inspectors are supplied with forms on which they report the sanitary conditions surrounding homes, churches, schools, saw-mills, and similar industrial plants.

In these nine States is a population of 17,743,253, distributed over an area of 415,950 square miles. About 80 per cent of these people live in the open country, where since the earliest settlement soil pollution has been almost universal and with no thought of its serious consequences. (See Table 3.)

(2) **Teaching the people the dangers of soil pollution and how to stop it.**—To get fourteen millions of people, distributed over half a million square miles of territory, to abandon a habit ingrained by centuries of usage and to conform to specific sanitary regulation will require the coöperation of permanent agencies in a system of education directed definitely to this end and kept up for a long period of time. A beginning has been made.

a. *Teaching the people by public lectures.*—The State

director of sanitation and each member of his staff is supplied with lantern and a set of slides. Each man is now making his own photographs of local conditions. Some of the inspectors are preparing a series of charts. With this equipment they are prepared to tell and illustrate the life story of the parasite; to show how the young hookworms get into the soil and under what conditions they thrive there; to make vivid by pictures how the infection is spread when the barefoot child walks over this ground; to show how soil pollution may be prevented; to intensify the lesson by exhibiting photographs of local conditions.

The inspector tells this story to popular audiences in the evenings, and to the schools which he inspects during the day. One inspector says his purpose is to make the story so simple, so direct, so vivid that every child will feel it tingle on the bottom of his bare foot when he walks on polluted soil.

This story has been told 1,240 times during the year by the regular staff in these nine States; it has reached more than 196,000 people. The school child has repeated it at home and neighbor has repeated it to neighbor.

b. Teaching the people by means of bulletins and folders.—The State boards of health in these nine States have published and distributed during the year 546,000 copies of special bulletins and folders on the dangers of soil pollution and how to avoid them. (See Table 4a.)

c. Teaching the people through the public press.—The State director and his staff make it a part of the work to visit the papers of the State to establish personal relations with the editor, to give him first-hand knowledge of the facts, and to enlist the paper as a permanent agency in the

service. Virginia, North Carolina, and Mississippi have the coöperation of practically the entire State press and have the press service effectively organized. Definite organization of this service in each State will be effected as soon as practicable. (See Table 4a.)

d. Teaching the people through the schools.—The work of enlisting the schools as a permanent agency in this sanitary service has only begun. The State superintendent of education in each State has offered his active coöperation. Three lines of definite work are now in progress:

(a) *Putting a stop to soil pollution at the schools.*—For the protection of the children and as an object-lesson to the community, sanitary privies are being built at the schools. This is being urged by the sanitary inspectors in all the States, by the State organizer of school improvement leagues in all the States except North Carolina, and by many of the county superintendents. In Virginia and Louisiana the State boards of health have promulgated regulations having the force of law requiring that all the schools of those States be provided with sanitary toilets; the State departments of education agree to coöperate in carrying them into effect. The work has been done in two districts in Virginia and is under way in 24 other districts. The county school boards of four counties in North Carolina and one county in Tennessee have ordered that sanitary privies be provided at all the schools in these counties, and that the expense be borne by the county school funds. Virginia has a record of 1,570 privies built. This work will be pushed systematically.

(b) *Teaching the school children the dangers of soil pollution and how to avoid them.*—The sanitary inspector,

after inspecting the children in a school, gives them definite instruction in sanitary measures. In some communities physicians have volunteered to give this instruction at the schools. In two towns in North Carolina and two counties in Georgia the school authorities have provided local funds for this service. The Mississippi State board of health has issued a bulletin on hookworm disease especially designed for use in the schools; it has also supplied the schools with a placard to be framed and hung where it can be easily read. The North Carolina State department of education has published a fifty-thousand edition of a bulletin on soil pollution for use in the public schools of the State. This has been distributed through the county superintendents to the public-school teachers with instructions that it be used as the basis of instruction to the school children. Dr. Ferrell, the State director of sanitation in that State, recently prepared for the department of education an outline for a series of talks on hookworm disease and soil pollution, the outline to be published by the department of education and distributed to the teachers for use as a basis for oral instruction to the children in all the public schools of the State.

The Arkansas State department of education has a bulletin ready for publication. In the State Normal School, at Athens, Georgia, the student teachers are being given instruction in hookworm disease to the end that they as teachers may be able to give definite instruction to the children in their own schools.

These are permanent educational agencies; the work which this year has made only a beginning will go on increasing in volume and efficiency.

IV. Summary of expenditures.—

	Expended by—		
	State.	Commission.	Total.
Alabama	\$150.00	\$1,444.32	\$1,594.32
Arkansas .....	.....	4,474.20	4,474.20
Georgia	1,880.00	6,933.86	8,813.86
Louisiana	400.00	549.99	949.99
Mississippi	4,500.00	6,283.11	10,783.11
North Carolina	2,000.00	9,948.76	11,948.76
South Carolina	1,000.00	4,029.91	5,029.91
Tennessee	692.86	5,002.20	5,695.06
Virginia	2,630.00	8,353.09	10,983.09
Totals.	\$13,252.86	\$47,019.44	\$60,272.30

Enlisting the Physicians.

State.	Number of physicians in State.	Number of physicians personally instructed.	Number of lectures given to physicians.	Number of physicians reached.	Number of letters and circulars sent to physicians.	Number of bulletins sent to physicians.	Physicians now treating the disease.
Alabama.....	2,200	115*	5	85	....	2,200	440*
Arkansas.....	3,600	275	21	450	3,000	7,000	500*
Georgia.....	2,887	800*	9	156	2,887	2,887	576
Louisiana.....	2,033	359	3	165	2,500*	7,000	
Mississippi.....	2,054	280	10	200	2,454	4,168	450
North Carolina.....	1,500	674	18	745	3,418	4,000	838
South Carolina.....	1,113	84	9	350	1,113	1,113	100
Tennessee.....	3,449	400*	14	250*	1,200*	6,898	
Virginia.....	2,300	461	45	1,200*	....	13,800	500*

* Estimated.

Examinations and Treatment.

State.	Number of schools inspected.	Number of farms or families examined.	Number of persons examined.	Positive diagnoses.		Persons treated.		
				Clinical.	Microscopic.	On record.	Estimated. Not on record.	Total.
Alabama.....	31	.....	1,262	801	92	3,330	.....	3,330
Arkansas.....	46	450	2,250	1,387	442	1,400	6,000	7,400
Georgia.....	163	.....	17,775	4,572	1,165	.....	.....	.....
Louisiana.....	79	240*	5,000*	1,000*	79	824	4,000	4,824
Mississippi.....	150*	472	9,331	2,737	1,682	8,000	6,000	14,000
North Carolina..	238	390*	33,162	4,408	7,949	665	400	1,065
South Carolina..	115	200	4,900	2,200	85	204	.....	204
Tennessee.....	136	1,564	3,055	1,052	545	.....	8,000	8,000
Virginia.....	300*	2,500*	25,000*	10,000*	2,750	.....	.....	.....

* Estimated.

Putting a Stop to Soil Pollution—Results of Sanitary Survey.

State.	Area (sq. miles).	Population.	Per cent living in country.	Sanitary conditions.
Alabama.....	51,000	2,138,000	70	Of 31 schools inspected, only 1 in 5 has privy of any kind for girls, and but 1 in 10 has privy of any kind for boys. Inspection of schools, churches, farms, and saw-mills has failed thus far to discover one sanitary privy outside of cities and towns.
Arkansas.....	53,045	1,500,000	80	
Georgia.....	58,980	2,609,000	83	
Louisiana..	48,506	1,656,388	63	Of homes, schools, and churches outside of cities, majority have no privy of any kind; sanitary privies very rare. Open earth closets practically universal. Relatively few homes and schools in the country have closets.
Mississippi.....	46,340	1,708,272	80	
North Carolina.....	52,000	2,246,000	82	
South Carolina.....	30,170	1,515,400	80	Of 238 white schools inspected, only 6 have sanitary privies. Of 20 negro schools inspected, not one has sanitary privy. Mills inspected, 14; operatives, 5,700; open privies, 945; sanitary privies, 0. Fifty per cent of homes in rural districts have no closets. Fifty per cent of schools have no closets. Churches no toilets. Very few sanitary closets.
Tennessee.....	42,050	2,185,789	80	Of 456 homes inspected, none have sanitary privies and only 285 have privies of any kind. At country homes, schools, churches, and saw-mills, privies of any sort reported exceptional.
Virginia.....	40,125	1,854,184	83.5	From a record of 1,000 farms inspected, only 15 per cent were using a privy of any kind. Of 7,088 schools in the State, only 3,830 have privy of any kind.

Putting a Stop to Soil Pollution—Educating the People.

State.	Through bulletins.	Through the press.				Attitude of press.
		Papers in State.	Number personally visited.	Letters to press.	Articles furnished for publication.	
Alabama.....	20,000	247	10	23	19	In thorough sympathy.
Arkansas.....	60,000	210	65	420	12	Without exception favorable and willing to cooperate.
Georgia.....	34,000	246	83	"Many."	150*	Cannot answer.
Louisiana.....	25,000	78	20	128	3	Interested and ready to cooperate.
Mississippi.....	65,000	130*	35	135	40*	At beginning indifferent; slight opposition. At present all papers cooperating.
North Carolina.	152,000	312	157*	1,248	305	At beginning indifferent, humorous, often resentful. Now not one opposing. Practically all give active cooperation.
South Carolina.	10,000	...	...	None.	50	Most of the papers are supporting the work.
Tennessee.....	70,000	...	30*	....	15*	Lukewarm.
Virginia.....	110,000	150	25	300	1 each week.	Hopeful from start.

* Estimated.

Putting a Stop to Soil Pollution—Educating the People.

State.	Through the schools.				Through public lectures.		
	Number of teachers in State.	Teachers reached.			Number of lectures given.	Estimated number of persons reached by these lectures.	Sanitary privies built.
		By visit.	By letter.	By bulletin or leaflet.			
Alabama.....	8,677	35	57	104	52	3,000	No report.
Arkansas.....	9,522	98	3,000	9,000	58	30,000	
Georgia.....	.....	578*	600*	600*	200*	17,000	
Louisiana.....	3,000*	800*	500*	All.	171	21,000	75*
Mississippi.....	6,929	450	800	All.	254	35,000	75
North Carolina.....	11,500	550	4,000	10,000	100	59,000	No report.
South Carolina.....	.....	800	50	1,000	75	6,000	No report.
Tennessee.....	10,400	No record.	No record.	All.	65*	9,000	10
Virginia.....	8,407	1,100	All.	All.	265	25,000	1,570

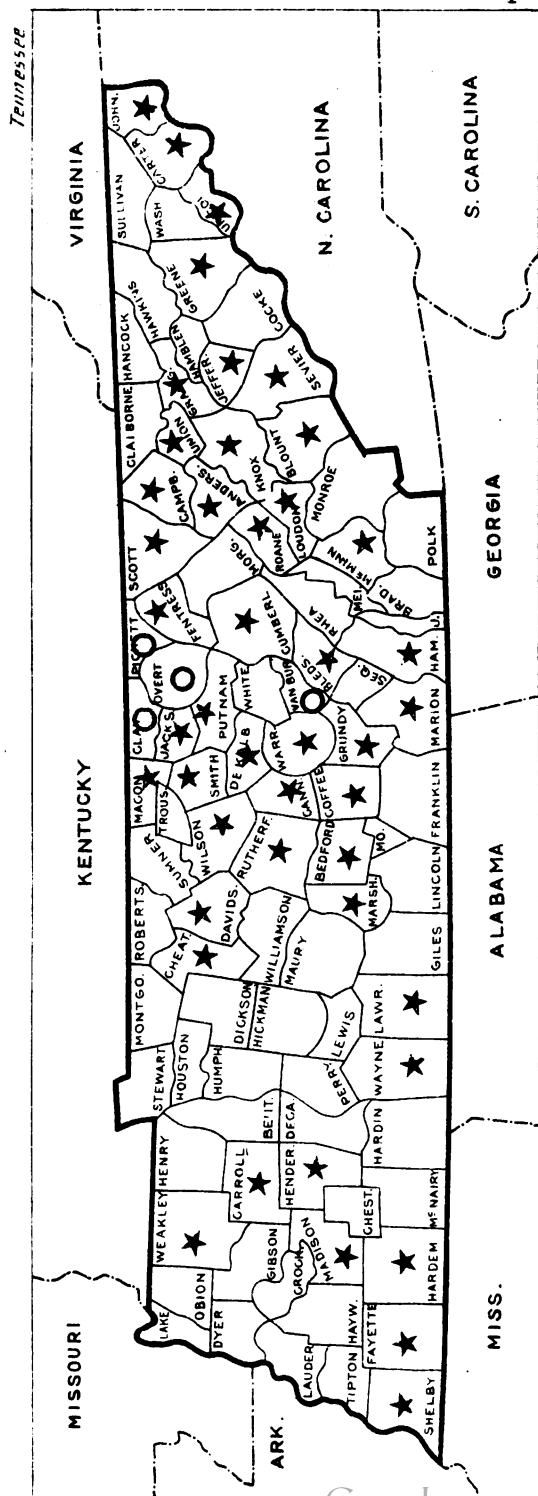
* Estimated

KEY, Maps 1 to 8.

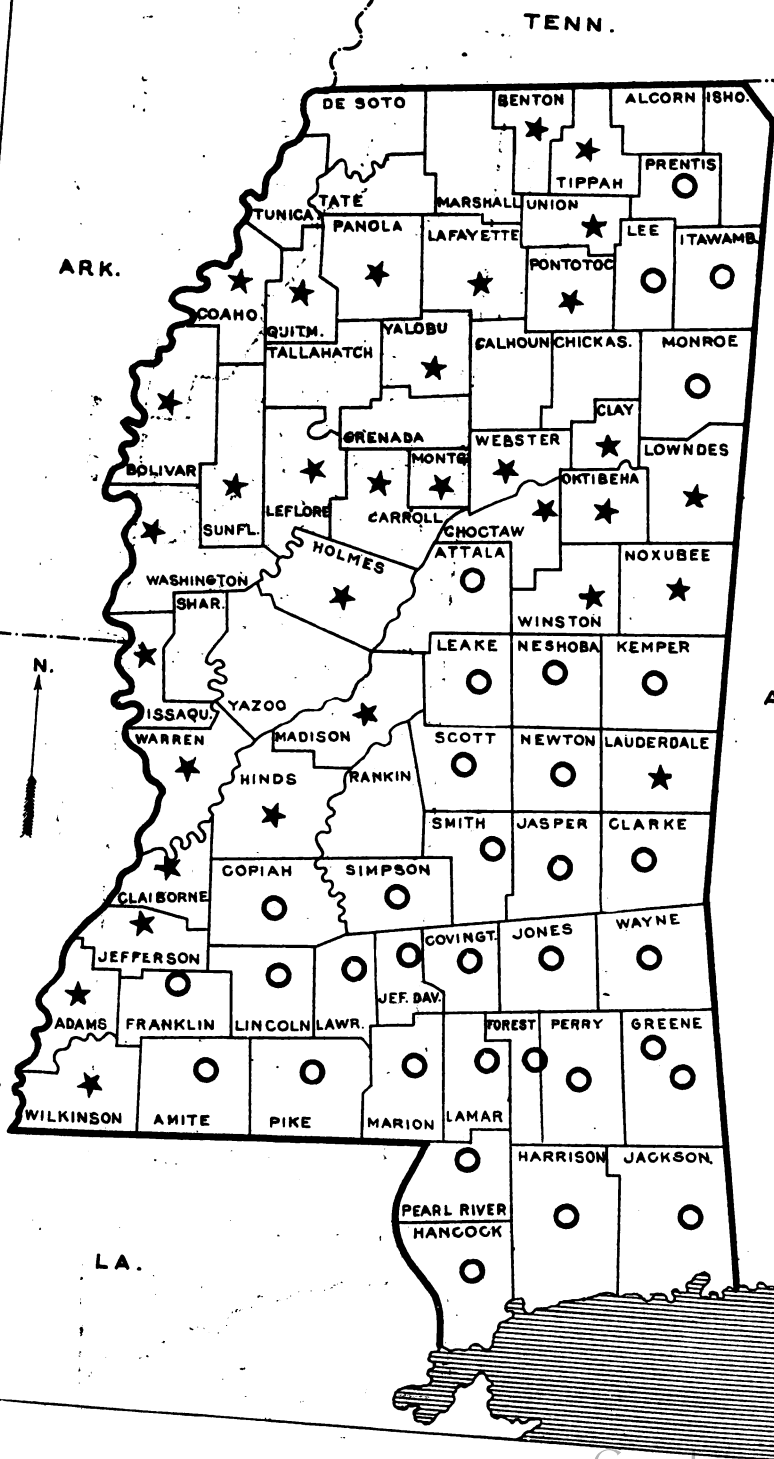
○ Survey made in detail, infection HEAVY.

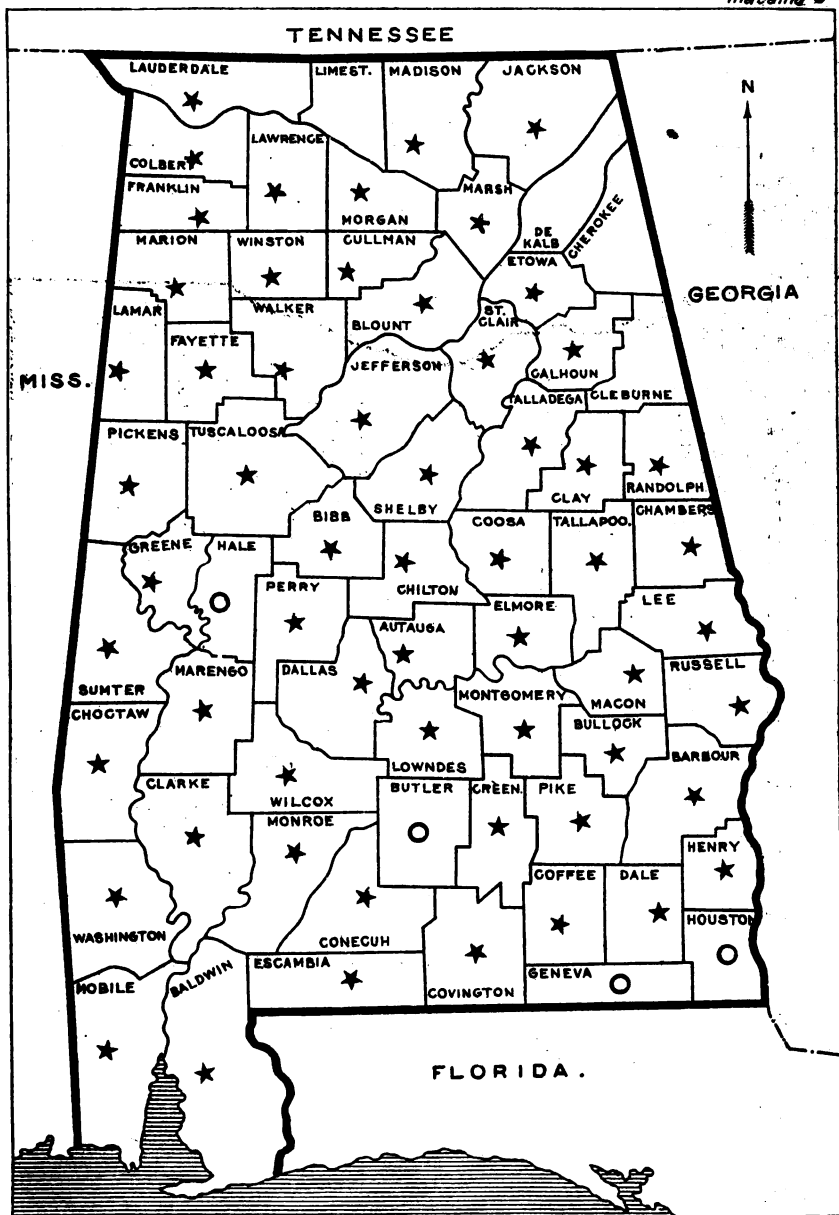
★ “ “ “ “ LIGHT.

★ Preliminary survey made, infection demonstrated.



Mississippi.



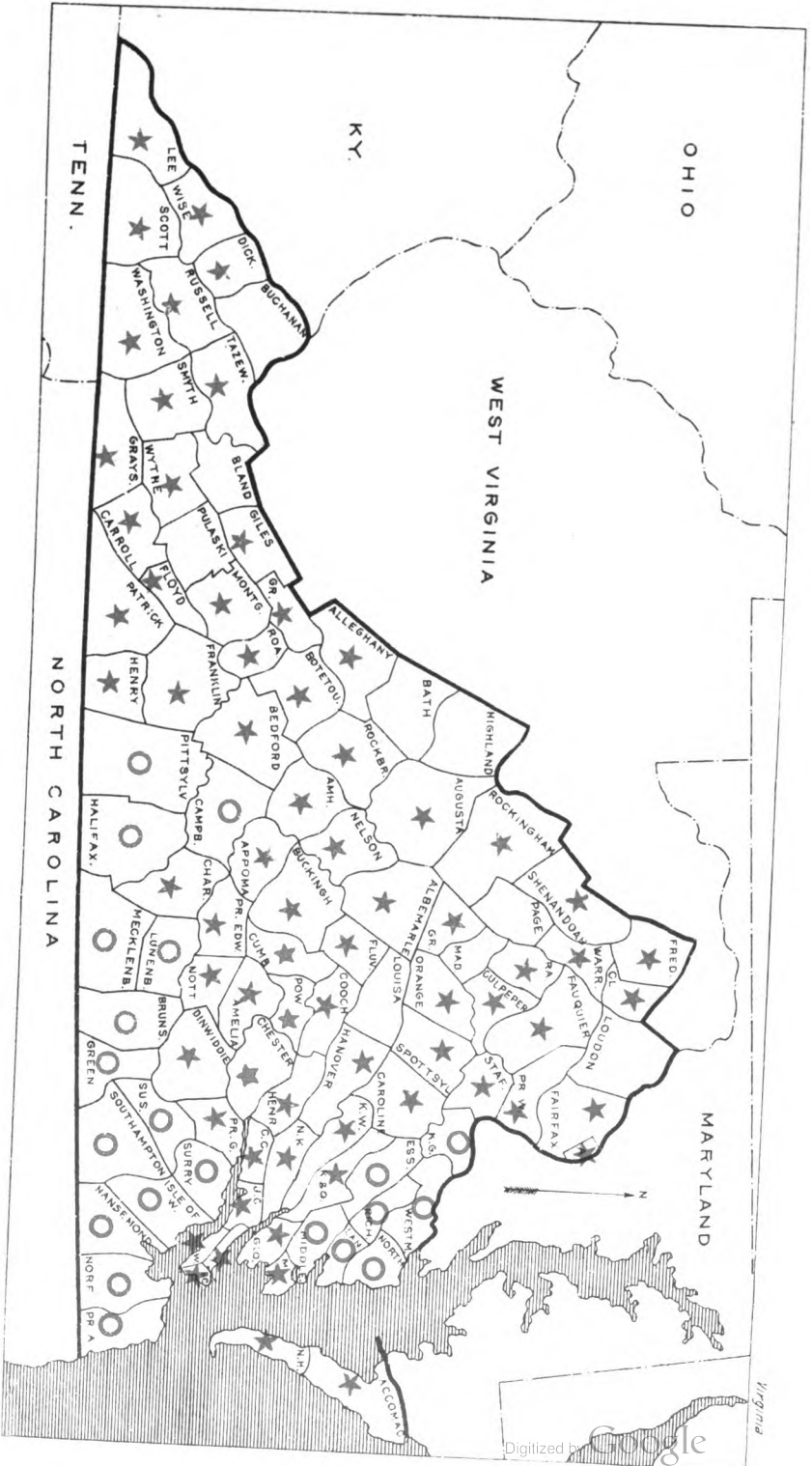


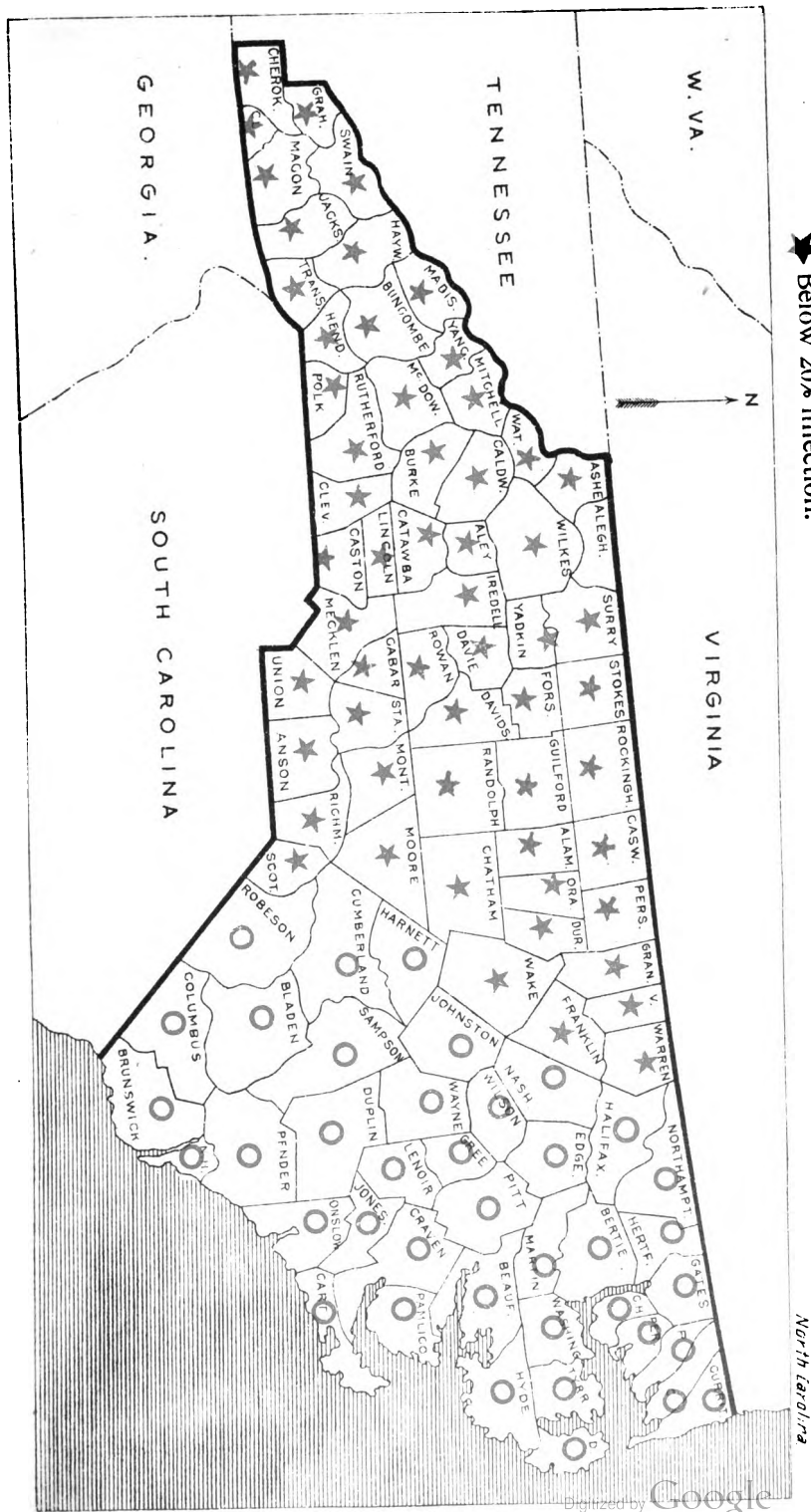


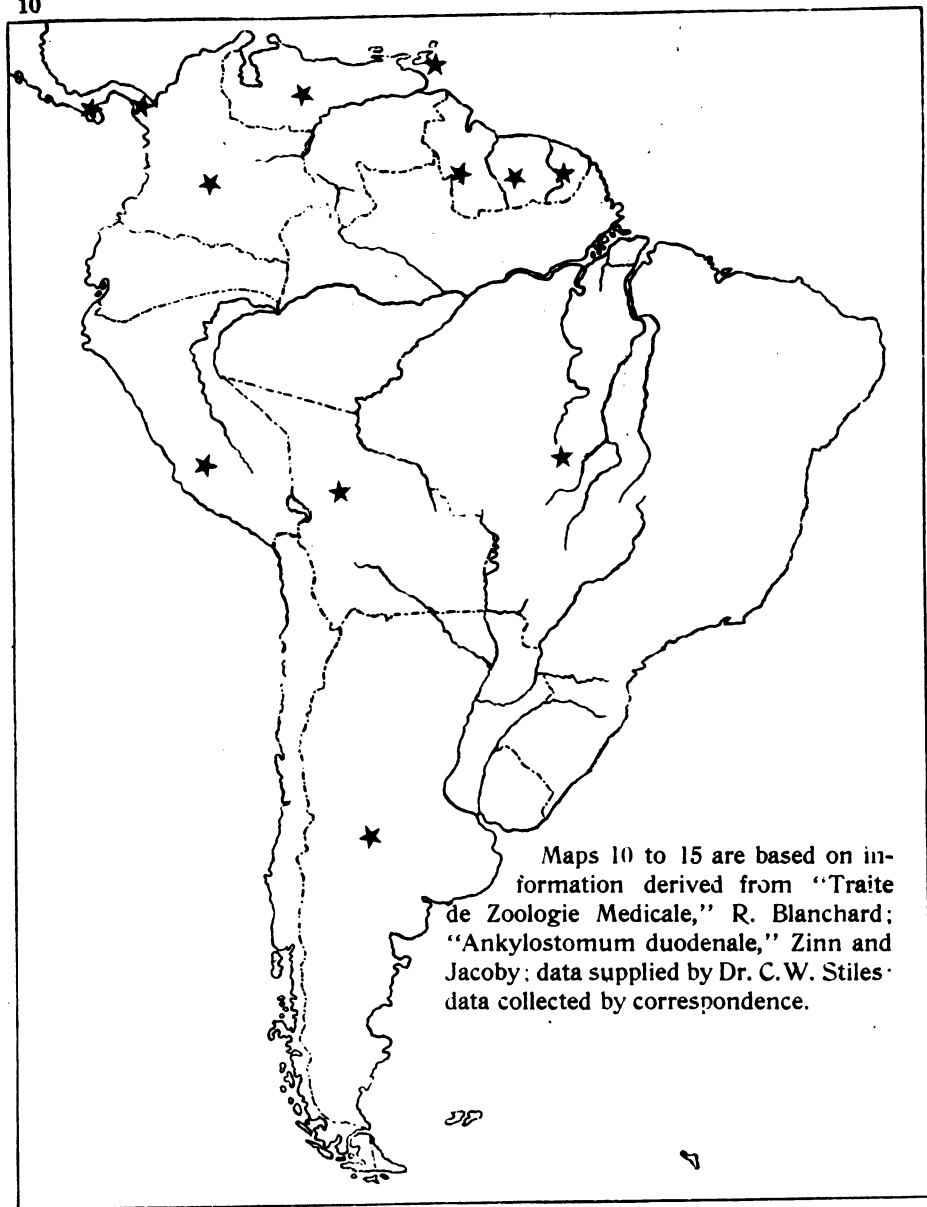




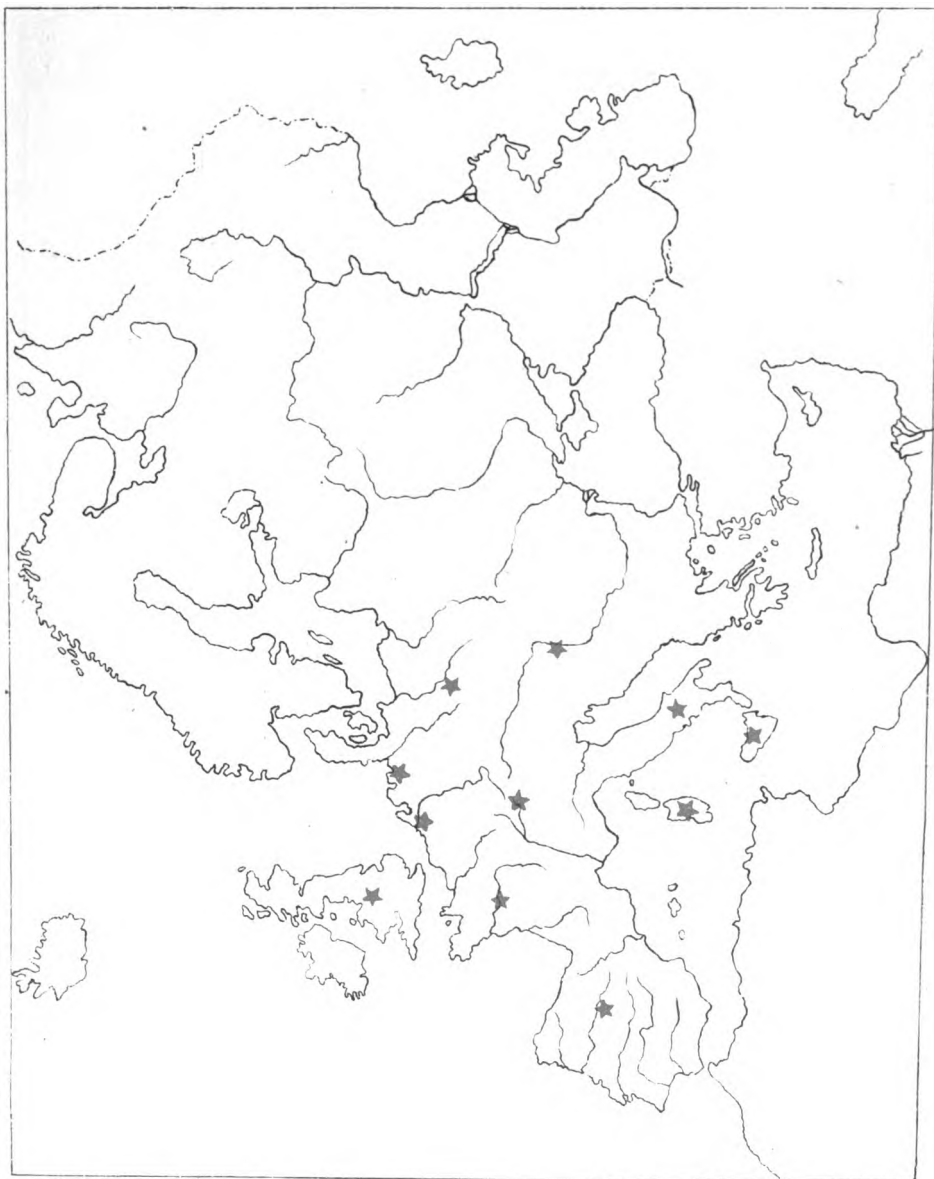


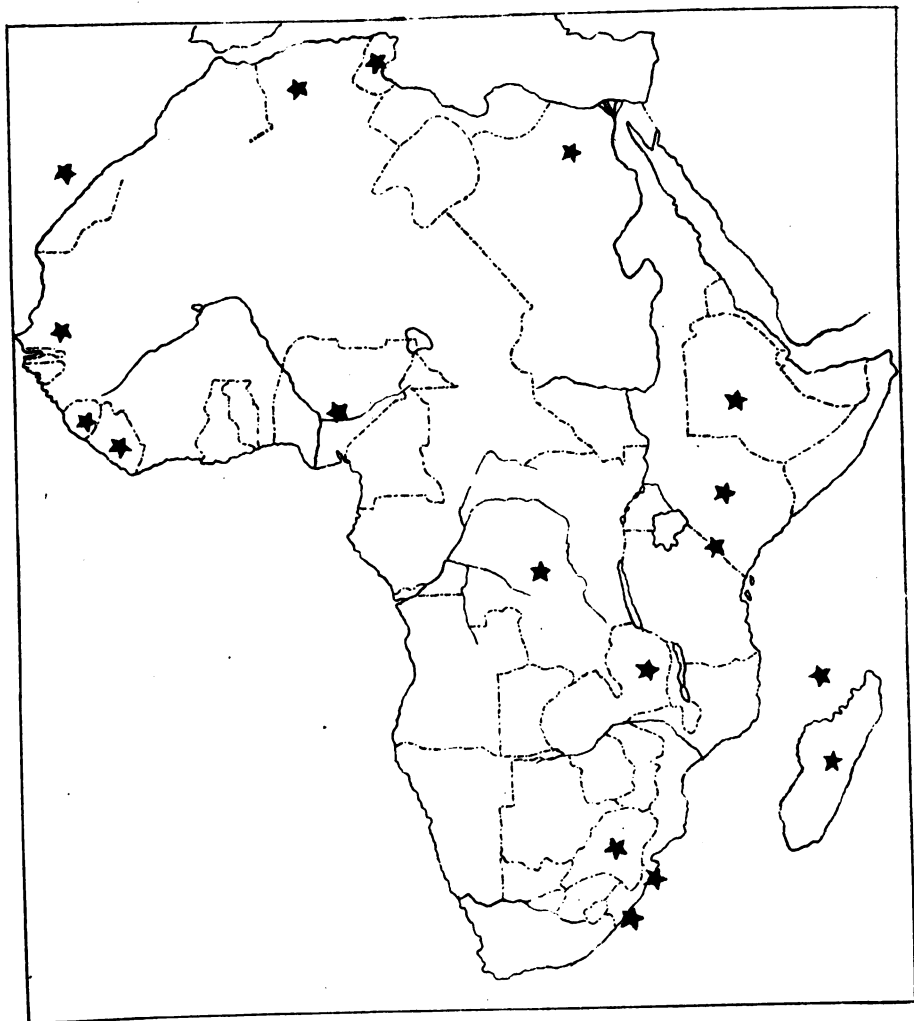


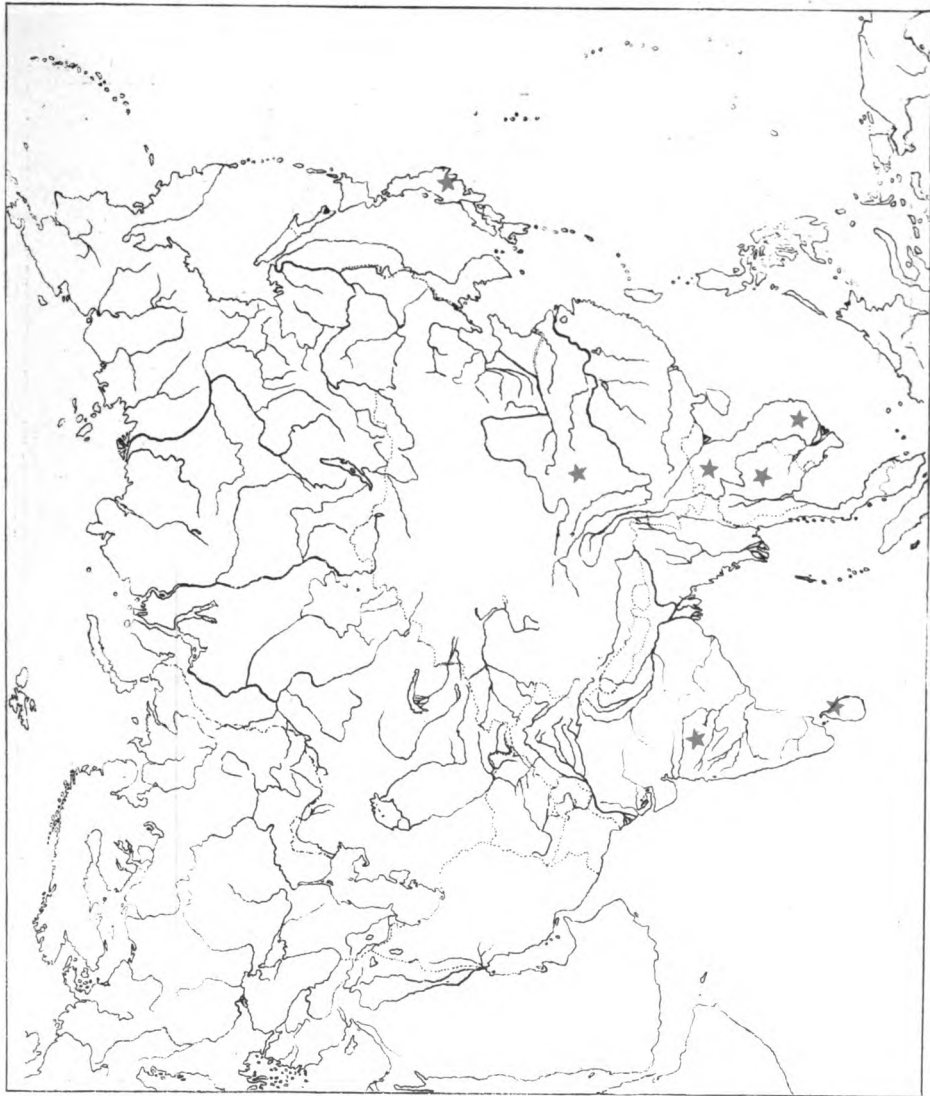


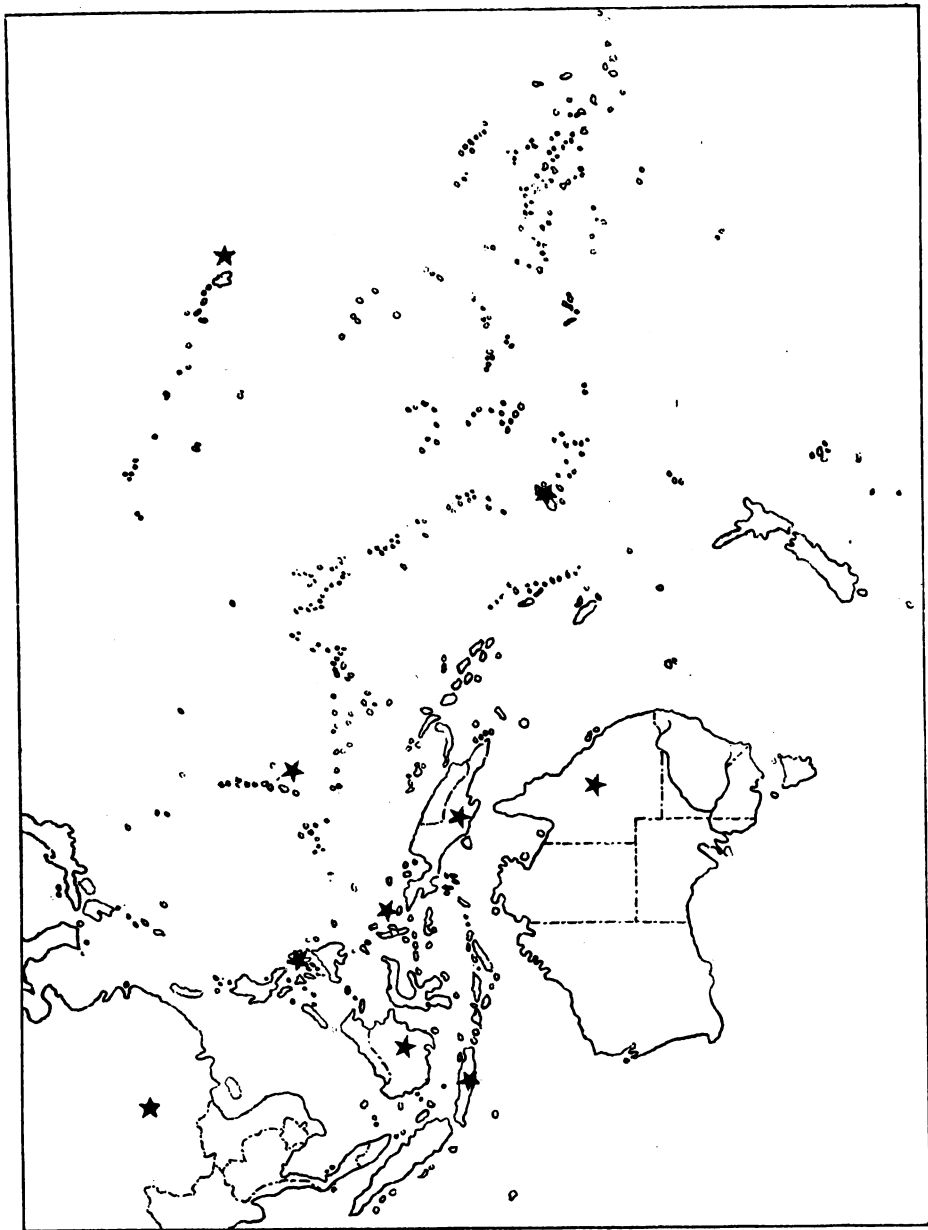












APPENDIX.

The Florida State Department of Health had instituted a campaign against hookworm disease before the Rockefeller Sanitary Commission was organized. In response to Dr. J. Y. Porter's very cordial invitation, the administrative secretary of the Commission and many of the State directors of sanitation visited Florida early in the year to study the methods and results of that work. Not only are we personally indebted to Dr. Porter and his staff for many courtesies, but to them the service is indebted for cordial co-operation and helpful suggestion at every point. We have asked the privilege of appending this summary of the work in Florida for its intrinsic merit and as an acknowledgment of our indebtedness to the work and workers in that State.

FLORIDA STATE BOARD OF HEALTH.

A Summary of Hookworm Work Accomplished in Florida from October 12, 1909, to December 31, 1910.

MILEAGE.

The State health officer and three assistant State health officers during this period, in travel chargeable to hookworm disease, covered—

By railway	6,220 miles
By teams	1,070 miles
By boats	330 miles

A total of..... 7,620 miles

EXPENSES INCURRED.

Salaries of two assistant State health officers while actively engaged in the hookworm campaign	\$1,508.30
Travel expenses during the same period (an average per man per month of \$97)	1,057.15
	<hr/>
Total expended by the two field men...	\$2,565.45
Cost of hookworm literature during 1909 and 1910, which includes circular letters, case record blanks, and 20,000 leaflets for popular distribution	65.00
Cost of that portion of Florida Health Notes, the monthly bulletin, devoted to hookworm disease, being 72 pages, or 4½ monthly issues of 16 pages, with a circulation per month of 17,000, and equivalent to 1,224,000 pages....	592.00
Laboratory salaries and maintenance, 1909, chargeable	525.00
Laboratory salaries and maintenance, 1910, chargeable	2,650.00
Six hundred and two indigent cases treated, treatment paid for by State board of health, at \$3 each.....	1,806.00
Travel expenses of State health officer and assistant State Health Officer Byrd, in inspections, delivering lectures, etc.....	534.00
	<hr/>
Total expense	\$8,737.45

Synopsis of the Work Accomplished by Two Assistant State Health Officers.

TIME ENGAGED.

October 12, 1909, to March 24, 1910.....	163 days
January 3, 1910, to May 11, 1910.....	128 days
August 28, 1910, to September 30, 1910.....	33 days

Number of days in the field..... 324

MILEAGE TRAVELED.

By rail	3,360 miles
By teams	1,070 miles
By boats	330 miles

Total 4,400 miles

Three thousand two hundred and twenty-seven suspicious cases of hookworm disease found.

MICROSCOPICAL EXAMINATIONS MADE.

Positive	399
Negative	179

Total 578

Inspected 79 white schools; 4 negro schools.

Visited 94 towns in 10 counties.

Lectures before public audiences.....	13
Lectures before school children.....	79
Lectures delivered by Dr. Byrd.....	14

Total 108

Other work accomplished during the same period:

Two outbreaks of scarlet fever directed.

Four conferences regarding disposal of city sewage.

Two smallpox cases isolated and cared for.

Two epidemics of typhoid fever investigated.

Prevalence of catarrhal and follicular conjunctivitis reported in five schools.

Record of Cases.

Under the plan of the State board of health to pay physicians three dollars for treatment of indigent cases of hookworm disease, 602 cases have, during the year 1910, been paid for.

Conforming to the minimum requirement of the board in the matter of treatment, 67.87 per cent of these 602 cases were cured. Twenty-three cases—3.8 per cent of the series—were also freed of the worms, the treatment progressing beyond the minimum requirement up to four, five, seven, and nine courses of treatment.

It is found that this plan has been taken advantage of by 45 physicians in 23 counties of the State.

The patients so treated were distributed over 78 towns in the 23 counties.

Hookworm Examinations Made in the Bacteriological Laboratories.

1904 to 1908, one laboratory..... 507 specimens
1909, with one laboratory, 248 positive, 397
negative, and 23 unfit for examination.... 668 specimens

In March, 1910, a bacteriological laboratory was established by the State board of health at Tampa, and in July, 1910, an additional laboratory was established in Pensacola, Fla. The central laboratory is located at Jacksonville.

During 1910 the three laboratories examined 16,095 disease specimens of all kinds. Of this number 45 per cent, or 7,402, have been examinations for the hookworm. Fifty-two per cent of the specimens of all kinds received at the Jacksonville laboratory were submitted for examination for hookworms; 28 per cent of the specimens received at the Tampa laboratory were for hookworm examination, and 33 per cent of those received at the Pensacola laboratory were for this examination.

Summary Examinations for Animal Parasites at the Three Laboratories, 1910.

HOOKWORMS.

	Positive.	Negative.	Unfit.	Total.
January.....	210	151	12	373
February.....	205	165	2	372
March.....	446	293	0	739
April.....	362	262	8	632
May.....	424	348	19	791
June.....	309	295	11	615
July.....	415	311	8	734
August.....	430	341	8	779
September.....	454	393	2	849
October.....	370	221	3	594
November.....	204	219	0	523
December.....	224	177	0	401
Total.. ..	4,153	3,176	73	7,402
Number of examinations for other parasites.....				308
Add to this the examination by two assistant			Positive, 399	
State officers in the field.....			Negative, 179	
				578
Total number of examinations.....				8,288

Four thousand five hundred and fifty-two, or 61.49 per cent, of the above examinations were positive for hookworms.

The examinations for parasites other than the hookworm were divided as follows:

<i>Amœba coli</i>	2
<i>Ascaris lumbricoides</i>	73
<i>Lamblia intestinalis</i>	1
<i>Oxyuris vermicularis</i>	19
<i>Strongyloides intestinalis</i>	8
Tapeworms	95
<i>Trichocephalus dispar</i>	106
Unidentified eggs	4
<hr/>	
Total	308

Of these 308 specimens, 67 were examined in the field by two assistant State health officers, and 241 were examined by two of the laboratories.

During 1910 the laboratory at Jacksonville has sent out in the State 10,004 containers for submitting specimens for examination for hookworm disease, 12 per cent of which have not been returned.

During 1910 specimens of all kinds were received from 562 physicians in 197 towns, distributed among all of the 47 counties.

During 1910 specimens have been received from 34 towns in which no physician lives. These 34 towns are distributed over 17 counties.

One thousand physicians are licensed to practice in Florida. Specimens of all kinds have been received from a little more than 50 per cent of them.

Results of the Campaign.

An attempt was made to determine the number of cases of hookworm disease treated in five counties which had, six months before, been thoroughly gone over in the cam-

paign by the assistant State health officers. This territory was canvassed again, and every physician interviewed and information obtained as to the number of cases he had treated. It was found that 66 physicians in 24 towns had treated 3,142 cases.

Extending the investigation, it was found that 562 physicians, in 197 towns distributed over the 47 counties, had submitted specimens of all kinds to the laboratories for examination during 1910. Two hundred and one of these physicians in 39 towns did not, however, submit hookworm specimens; but 58 of these 201 physicians, it is known, and who live in 33 towns, are treating hookworm disease. Among these 58 physicians are many of the pioneers in this work, who use their own microscope for diagnostic purposes.

Assuming that the physicians interviewed represent an average, then the 419 physicians, it will be seen, have treated 20,000 cases, 60 per cent of which were cured. This does not account for the other 500 physicians in Florida who have not submitted specimens to the laboratories, but many of whom, if not all, have been treating the disease.

Quite recently a map of Florida was taken, and with the Medical Directory of the American Medical Association and office records of the board as guides, a tack was placed at every town where there is one or more physicians. At such towns as it was known that hookworm disease was being treated, a black-headed tack was placed. At other places a red-headed tack was placed. It is found that the black-headed tacks are far in the ascendancy, and that as our information becomes more and more complete the red-headed tacks are often disappearing from the map. It is believed at the present time that there is hardly a physician in the State not treating hookworm disease. This belief is based upon the fact that for the last several months not one such has been encountered, notwithstanding a corps of four or five physicians have been covering the State in all directions.

It may be said at this juncture that the hookworm work in Florida would continue to go on, even though the board took no further part in it; that the hookworm problem will now solve itself, so far as it can be solved; that people in all walks of life, when indisposed from any cause they do not understand, suspect hookworms, and have examinations made accordingly; that hookworm information is now household information, and these things, after all, are the most that can be hoped for in this generation.

It is the intention of the board to continue payment for the treatment of indigent cases and to continue publishing literature on hookworm disease, to continue the educational crusade, but it believes that the great mass of the important work in this direction is behind rather than ahead.

PUBLICATION No. 4

STATE SYSTEMS OF
PUBLIC HEALTH
IN
TWELVE SOUTHERN STATES

ROCKEFELLER SANITARY COMMISSION
WASHINGTON, D. C.
1911

Rockefeller sanitary commission for the eradication
of hookworm disease, Wash., D.C.

PUBLICATION NO. 4

STATE SYSTEMS OF
PUBLIC HEALTH
IN
TWELVE SOUTHERN STATES

ROCKEFELLER SANITARY COMMISSION
WASHINGTON, D. C.
1911

RC 298

RS

no. 4

WASHINGTON, D. C.
PRESS OF JUDD & DETWEILER, INC.,
1911.

INTRODUCTORY NOTE

Soon after taking up the work of the Rockefeller Sanitary Commission my attention was called to the fact that the work got under way more readily and accomplished results more easily in some States than in others. I became convinced that one important factor entering into this difference in results was difference of effectiveness in the State organization of the public health service. A man can accomplish most when the tools with which he works are adapted to the work which he is doing. This led me to a study of the organization of the public health service in each of these twelve States. The analysis here given was made primarily for my own satisfaction and guidance. A copy of it was sent in manuscript form to each of the State boards of Health. The demand for additional copies has made it seem advisable to print a small edition of it for free distribution.

WICKLIFFE ROSE.

ALABAMA

State System of Public Health

- I. State department of health.
 1. State board of health:
 - a. Organized 1873.
 - b. Membership: The entire State medical association.
 - c. Legal qualifications: Must be a licensed physician; member of State and county medical association.
 - d. Term of office: For life or during good standing.
 - e. Powers and duties: *
 - (1) Enforces public health laws.
 - (2) Investigates causes, modes of propagation, means of prevention of endemic, epidemic, infectious and contagious diseases.
 - (3) Investigates influence of localities and employments on health of people.
 - (4) Inspects public buildings, as schools, court-houses, public dairies, slaughter-pens, etc.
 - (5) Inspects water supplies.
 - (6) Regulates sanitation of depots and passenger trains.
 - (7) Has supervision and control over county boards of health.
 - (8) Advises State in all sanitary and medical matters.
 - f. Compensation: Expenses of attendance on meetings.
 2. State committee of public health: The Medical Association of Alabama selects ten censors for a term of five years; they retire in groups of two. When organized they constitute a board which acts in three capacities:

* Medical Laws of Alabama, 1909, page 16.

- a. As a Board of Censors.
 - b. As a State Board of Examiners.
 - c. As a State Committee of Public Health. This State Committee of Public Health is the executive agency corresponding to the State Board of Health in most States. It reports to the State Board of Health.
3. Executive officers:
- a. Chief executive officer:
 - (1) Title: State Health Officer.
 - (2) Appointed: Elected by the State Committee of Public Health, confirmed by the Medical Association.
 - (3) Term of office: Five years.
 - (4) Legal qualifications: Must be member of College of Councilors in State Medical Association. In practice member of committee.
 - (5) Powers and duties: Is executive officer of State Board of Health; supervises local health agencies; executes laws and regulations of board.
 - (6) Compensation: \$5,000 per annum.
 - b. Assistants:
 - (1) Bacteriologist and pathologist: Appointed by board; salary, \$2,500.
 - (2) Registrar of vital and mortuary statistics: Appointed by board.
 - (3) Chief clerk and one stenographer.
4. State laboratory:
- a. Located at Montgomery.
 - b. Established 1908.
 - c. Value of equipment: \$3,000.
 - d. Lines of work regularly pursued: Pathological and bacteriological examination of material from any source in State, including milk and water supplies. Pasteur treatment free.

- e.* Staff: State bacteriologist and three assistants.
- f.* Expenditures: Records not available.
- 5. Available funds for State health department:
 - a.* Source: Appropriation by legislature.
 - b.* Total amount for year 1909-1910: \$16,000.

NOTE.—An additional \$20,000 is available for quarantine purposes in case of epidemics.

- c.* How used: For salaries, traveling expenses, printing and office expenses, traveling expenses of State committee of public health, laboratory supplies.

II. Local health organizations.

1. County organizations:

- a.* Name: County board of health.
- b.* How constituted: County medical society organized under constitution of the State medical association is the county board of health.
- c.* Duties, authorities and powers:
 - (1) Supervises administration of State health laws in county.
 - (2) Investigates cases of endemic, epidemic, infectious and contagious diseases and enforces measures of relief.
 - (3) Abates public nuisances.
 - (4) Supervises sanitation of public buildings.
 - (5) Elects county health officer.
 - (6) Elects health officer for every incorporated city or town in county.
 - (7) Elects physician to attend inmates of county poorhouse and jail and fixes his term of office.
 - (8) Requires annual reports of county and municipal health officers showing all public health work done and giving vital and mortuary statistics.

- (9) Requires county health officer to send State board of health monthly report of births and deaths in county.
- (10) Performs all duties required by law.
- d.* Relation to State board of health: Under general supervision and control of State board of health.
- e.* Executive officers:
 - (1) Title: County Health Officer.
 - (2) Elected: By county board of health.
 - (3) Term of office: Fixed by county board of health.
 - (4) Duties:
 - (*a*) Keeps register of births; of deaths; of persons attacked by communicable diseases.
 - (*b*) Supervises sanitary conditions of county.
 - (*c*) Investigates and reports outbreaks of communicable diseases.
 - (*d*) Supplies virus and vaccinates indigent persons at expense of county.
 - (*e*) Inspects all county institutions once each month.
 - (*f*) Makes monthly report of births and deaths to State board of health.
 - (*g*) Reports annually to judge of probate and county commissioners all public health and sanitary work done during year, with recommendations.
 - (*h*) Reports promptly to State board of health cases of communicable diseases.
 - (*i*) Reports to county board of health when required.

- (5) Compensation: Fixed by county commissioners; minimum salary, \$10 per thousand of population for counties of 10,000 inhabitants or less; decrease of above rate not to exceed 10 cents per thousand of population up to a population of 100,000; beyond this no further decrease. Salaries range from \$200 to \$1,800 a year. Average for all counties, \$500.

2. Municipal organization:

- a. Board of health: The county board of health is the board of health for all incorporated towns and cities in county.

- b. City health officer:

- (1) Elected by county board of health.
- (2) Term of office: Fixed by county board of health.
- (3) Duties: Within his jurisdiction similar to duties of county health officer for county outside municipalities. Reports to county health officer, to mayor and council, to county board of health.
- (4) Compensation: Fixed by municipal authorities; paid from municipal funds.

III. Medical societies in the State.

1. The State medical society:

- a. Name: Medical Association of Alabama.
- b. Organized 1847; reorganized 1873.
- c. Number of members: 1,685.
- d. Meetings: Annually.
- e. Attendance at meetings: 350 to 500.
- f. Official connection with State health department: State health department is responsible to State medical association and renders a report thereto summarizing its work.

2. County medical societies:

- a. Number: 67; every county in the State organized.

- b.* Meetings: Varying from 2 to 54 meetings a year; average for all counties, 6 plus.
 - c.* Number of members: Varying from 4 to 236; average for all counties, 24 plus.
 - d.* Efficiency: Of the 67 counties organized, 33 are reported as good, very good, or excellent; 6 as unsatisfactory; the remaining 28 as fair to fairly good.
3. City medical societies: Organized and efficient in larger towns and cities.

NOTE.—No district medical societies in Alabama.

ARKANSAS**State System of Public Health**

- I. The State department of health.
 1. State board of health:
 - a.* Organized 1881.
 - b.* Number of members: 6.
 - c.* Appointed by the Governor.
 - d.* Legal qualifications: All must be physicians; majority must be graduates having at least 7 years' experience.
 - e.* Term of office: Two years.
 - f.* Duties: Legislative and advisory on public health matters.
 - g.* Compensation: None.
 2. Executive officers:
 - a.* Chief executive officer:
 - (1) Title: Secretary State Board of Health.
 - (2) Appointed: Elected by the board.
 - (3) Term of office: Two years.
 - (4) Legal qualifications: Shall have skill in public health and sanitary service.
 - (5) Duties: Is executive officer of the board; has powers and privileges of a member of board.
 - (6) Compensation: None.
 - b.* Assistants: Board may engage suitable persons to render public health services when necessity requires. No one regularly employed.
 3. State laboratory: None.
 4. Available funds: No available funds for State board of health. State has never made appropriation for public health purposes. The board is not active; has never maintained an office.

II. Local health organizations.

1. County organizations:

- a.* County board of health.
- b.* How constituted: Three members; appointed by county judge.
- c.* Term of office: Two years.
- d.* Duties: General control of public health. Powers rarely exercised.
- e.* Compensation: None. County judge may in his discretion allow compensation for special services.
- f.* Number in State: Most counties have an organization in form; they rarely function.

2. Municipal organizations:

- a.* City board of health: Provided for by city charters.
- b.* How constituted: Each city has its own method. Usually chiefs of departments constitute board of health; city physician chief health officer. In some cases board is appointed by city council; in smaller cities or towns by mayor. Term usually about two years.
- c.* Duties: City boards of health have full powers to control health affairs of the city.
- d.* Compensation: Compensation allowed health officer varies in different cities; in Little Rock he is allowed \$900 a year.

III. Medical societies in State.

1. The State medical society:

- a.* Name: Arkansas Medical Society.
- b.* Organized 1874.
- c.* Number of members: 1,000.
- d.* Meetings: Annually in May.
- e.* Attendance at meetings: Average about 350.

- f. Official connection with State board of health: None. State society has committee on medical legislation and takes an active interest in laws looking toward the betterment of public health.
 2. County medical societies:
 - a. Number: 64 (75 counties in State).
 - b. Meetings: Usually monthly. In some counties annually.
 - c. Efficiency: Majority reported as indifferent; few counties doing active scientific work.
 3. District medical societies: Four in State; reported as active and as having excellent semi-annual programs.
 4. City medical societies: None.
- IV. Other agencies.
1. Associations for the prevention and control of tuberculosis.
 2. A few associations for the prevention of blindness.

FLORIDA

State System of Public Health

- I. State department of health.
 1. State board of health:
 - a. Organized 1889.
 - b. Number of members: 3.
 - c. Appointed by the Governor, confirmed by the Senate.
 - d. Legal qualifications: Must be "discreet citizens"; custom has made one a physician.
 - e. Term of office: Four years.
 - f. Powers and duties:
 - (1) To have general supervision of the public health of the State.
 - (2) To make, adopt, promulgate and enforce rules and regulations to provide for sanitation of all vehicles of transportation; of all hotels, schools, factories and buildings open to the public; to provide for proper care of all animals having communicable or infectious diseases; to provide for proper care of all persons suspected of having communicable diseases; to regulate disposition of garbage, sewerage and refuse; to provide for thorough investigation and study of all diseases in State and dissemination of knowledge concerning the same; to supervise and regulate city and county sanitation; and in general provide such measures as may be deemed necessary to preserve the public health.
 - (3) To adopt and enforce quarantine regulations. State board has control of mari-

time and domestic quarantine system of State. No place can operate quarantine without authority from State board. It is made the duty of the Governor to furnish State board means to enforce quarantine regulations.

- (4) To employ a sanitary engineer when necessary and provide for his compensation.
- (5) To acquire, maintain and administer a sanitarium for the treatment of tuberculosis.
- (6) To define and abate all public nuisances.
- (7) To quarantine against infected animals.
- (8) To maintain and administer a bureau of vital and mortuary statistics.
- (9) To require physicians to report immediately cases of yellow fever, smallpox, cholera, diphtheria, leprosy, scarlet fever.
- (10) To elect a State health officer, who serves as the executive officer of the board.
- (11) To report annually to the Governor.

NOTE.—All rules and regulations of the State board of health have the force of law.

g. Compensation: \$6 per day of actual service and mileage.

2. Executive officers:

a. Chief executive officer:

- (1) Title: Secretary and State Health Officer.
- (2) Appointed: Elected by the State board of health.
- (3) Term of office: Four years.
- (4) Legal qualifications: Must be a graduate physician of a reputable medical college; an expert in diagnosis of yellow fever, smallpox, cholera and other infectious diseases; a person of recognized ability in hygiene and sanitary science.

(5) Duties and powers:

- (a) Acts as secretary of State board of health.
- (b) Has executive control of quarantine system of the State.
- (c) As executive officer of the State board administers and enforces all laws, rules and regulations for the preservation of public health.
- (d) Employs, with approval of president of the board, persons to serve as county agents, as special agents and to perform such other duties as are necessary for the preservation of public health.
- (e) Compensation: \$3,000 per year.

b. Assistants:

- (1) Secretary to State Health Officer at salary of \$2,500.
- (2) Veterinarian at salary of \$1,600.
- (3) Two assistants who serve as field agents of the State Health Officer at salary of \$1,800 each.
- (4) Two clerks and office boy.
- (5) Laboratory staff for three laboratories.
- (6) Nineteen county agents.
- (7) Five sanitary patrolmen; one each for Jacksonville, Pensacola, Tampa, Key West, Miami.

3. State laboratories:

- a.* Number: 3.
- b.* Located: Jacksonville, Tampa, Pensacola.
- c.* Established: 1902. 1910. 1910.
- d.* For what purposes used: General bacteriological laboratories for examining specimens of suspected diphtheria, tuberculosis, malaria, typhoid, ophthalmia, cancer, etc. Administers Pasteur treatment.

- Digitized by Google

GEORGIA

State System of Public Health

I. State department of health.

1. State Board of Health:

- a.* Organized 1903.
- b.* Number members: 12.
- c.* Appointed by the Governor.
- d.* Legal qualifications: Must be a legally qualified practicing physician—one from each of the eleven congressional districts; a secretary and director of laboratories who must live in Atlanta.
- e.* Term of office: Six years, retiring in groups of two each year.
- f.* Duties and powers:
 - (1) Has supervision of all matters relating to the preserving of the life and health of the people of the State.
 - (2) Has supreme authority in matters of quarantine and may declare it and enforce it whenever deemed necessary.
 - (3) Makes and enforces reasonable orders for the prevention of the spread of contagious and infectious diseases.
 - (4) Duty to make careful inquiry as to cause of disease, especially when contagious, infectious, epidemic or endemic, and take prompt action to control and suppress it.
 - (5) Duty to collect and preserve record of births and deaths.
 - (6) Shall respond promptly when called upon by State or local government and municipal or township boards of health to investigate and report upon water supply, sewage, disposal of excreta, ventilation of public buildings.

- (7) Does not have power to supersede municipal boards of health where the same are properly maintained, but shall work in harmony with said local boards.
- (8) Has authority to make such reasonable rules and regulations as are deemed necessary by the board to establish, maintain and enforce quarantine.
- (9) Reports annually to the Governor.

NOTE.—It is made the duty of local boards of health and of the public and municipal officers of the State to enforce the rules and regulations of the State board of health, fine not to exceed \$50 for failure to obey.

g. Compensation: \$5 per day and expenses for time of actual service.

2. Executive officers:

a. Chief executive officer:

- (1) Title: Secretary and director of laboratories.
- (2) Appointed: Elected by the board.
- (3) Term of office: Six years.
- (4) Duties: Secretary and executive officer of the board when not in session.
- (5) Compensation: \$2,000 a year.

b. Assistants:

- (1) Assistant director of laboratories: In charge of department for manufacture of diphtheria antitoxin; salary \$2,100 a year.
- (2) Pathologist: In charge of Pasteur department; salary \$1,800 a year.
- (3) Bacteriologist: \$720 a year.
- (4) Chemist: In charge of water analysis for municipalities; salary \$1,200 a year.
- (5) Two assistants for antitoxin department; one assistant for other department; salaries \$300 to \$480 a year.

- (6) Clerical assistants: Two stenographers; compensation \$1,000 and \$360 a year.
 - (7) Two janitors at \$480 and \$336 a year.
 - 3. The State laboratory:
 - a. Located at Atlanta.
 - b. Established 1903.
 - c. Value of equipment: \$35,000.
 - d. For what used: Free microscopical examination of specimens sent for widal, tubercle bacilli, intestinal parasites, diphtheria, gonococci, malarial parasites, diplococcus, rabies; manufactures tuberculin, diphtheria antitoxin, gives Pasteur treatment, makes water analysis.
 - e. Staff:
 - (1) Director of laboratories.
 - (2) Assistant director of laboratories.
 - (3) Pathologist.
 - (4) Bacteriologist.
 - (5) Chemist.
 - (6) Three assistants and two janitors.
 - f. Expenditures: No regular amount; appropriation made from general fund.
 - 4. Funds available for department of health:
 - a. Source: Annual appropriation by legislature.
 - b. Total appropriation for 1909: \$21,500.
 - c. For what used: Salaries, traveling expenses, laboratory expenses, educational work, purchase of vaccine points, manufacture of tuberculin, Pasteur treatment, diphtheria antitoxin and, to a limited extent, quarantine work.
- II. Local health organizations.
- 1. County organizations: None.
 - 2. Municipal organizations:
 - a. How constituted: As provided by charter of each city or town; usually mayor and one or

two councilmen constitute a health committee and engage services of a physician when needed. Atlanta and Savannah have well organized boards of health maintaining laboratories.

- b.* How appointed: Usually by city council.
- c.* Term of office: Varies from one to two years, sometimes longer.
- d.* Duties: Control of sanitation, infectious and contagious diseases.
- e.* Compensation: Salary of health officer reported as "adequate" for Atlanta and Savannah, as "poor" for other cities and towns.

III. Medical societies.

- 1. State medical society:
 - a.* Name: Medical Association of Georgia.
 - b.* Organized 1849.
 - c.* Number of members: About 1,200.
 - d.* Meetings: Annual.
 - e.* Attendance at meetings: About 350.
 - f.* Official connection with State department of health: None.
- 2. County medical societies:
 - a.* Number: 83 (145 counties in State).
 - b.* Meetings: Monthly.
 - c.* Number of members: Estimated about 1,200 as total membership of all societies.
 - d.* Efficiency: Reported as "moderate."
- 3. District medical societies: Eleven in State.
- 4. City medical societies: Three.

KENTUCKY

State System of Public Health

I. State department of health.

1. State board of health:

a. Reorganized 1904.

b. Membership: Eight in number; seven appointed by Governor, confirmed by Senate; the eighth elected by the board as its executive officer.

c. Legal qualifications: All members legally qualified registered practitioners of the State. One member must be a homeopath, one an osteopath, one eclectic and the others allopathic physicians.

d. Term of office: Six years.

e. Powers and duties:

(1) Has general supervision of health of the citizens of the State.

(2) Investigates the causes of diseases, the causes of mortality and the effects of locality, employment, conditions, food, water supply and other circumstances upon the health of the people.

(3) Makes sanitary inspection of such localities and places as it deems advisable.

(4) Enforces quarantine.

(5) Elects its own secretary or executive officer.

(6) Elects its president and adopts by-laws for its own government.

f. Compensation: Reasonable compensation for time in actual service.

2. Executive officers:

a. Chief executive:

(1) Title: Secretary.

(2) Appointed: Elected by the State board of health.

- (3) Term of office: Four years.
 - (4) Legal qualifications: Legally qualified practitioner,
 - (5) Powers and duties:
 - (a) Shall keep his office at some place centrally located designated by the board.
 - (b) Is custodian of board property and keeps record of its transactions.
 - (c) Corresponds with local boards and boards of other States and keeps on file reports received from these sources.
 - (d) Aids in obtaining contributions for the board's library.
 - (e) Supplies blank forms and instructions to local boards of health.
 - (f) Collects information concerning vital statistics, knowledge respecting diseases and other useful information on subject of hygiene.
 - (g) Disseminates information among the people by means of reports and otherwise.
 - (h) Supplies local boards with reliable vaccine virus for gratuitous vaccinations of the poor.
 - (6) Salary: Determined by the State board of health; not to exceed \$1,200 a year.
3. State laboratory: An appropriation was made by the last legislature for the establishment of a laboratory.
4. Available funds:
- a. Source: Legislative appropriation.
 - b. Total amount for the year 1909: \$5,000. Printing provided for as in other departments of the public service. Special fund of

\$10,000 set apart as a contingent fund to prevent cholera or yellow fever. Can be used for no other purpose.

- c. For what used: The regular fund of \$5,000 used for salary and expenses of secretary and the expenses of the board.

II. Local health organizations.

1. County organizations:

- a. Name: Local board of health.
- b. How constituted: Composed of three practicing physicians appointed by the State board of health, the county judge and one person elected by the fiscal court of the county.
- c. Term of office: Two years.
- d. Powers and duties:
 - (1) Inaugurates and enforces such regulations as it deems necessary to prevent outbreak and spread of epidemic and communicable diseases.
 - (2) Has power to establish and locate eruption hospital for county.
 - (3) Empowered to enforce quarantine.
 - (4) Enforces rules and regulations of State board of health.
 - (5) Requires physicians to report cases of communicable diseases.
 - (6) Reports to State board of health at least quarterly.
 - (7) Elects county health officer.
- e. Relation to State board of health: Under general supervision of State board.
- f. Executive officer: County health officer; elected by county board of health and holds office at its pleasure; salary fixed by the fiscal court.

2. Municipal organizations:

- a. Name: City board of health.

- b.* How constituted: City council in every city of 10,000 inhabitants must appoint city board of health; six persons, three of whom are competent physicians; hold office three years.

In towns of 2,500 to 5,000 population board of trustees or council appoints three persons to constitute board of health.

- c.* Executive officer: City or town health officer; elected by city or town board of health; salary fixed by council or trustees.

III. Medical societies.

1. State medical society.

- a.* Name: Kentucky State Medical Association.
- b.* Organized 1851.
- c.* Number of members: 2,250.
- d.* Attendance at meetings: 450 to 750.
- e.* Connection with State department of health: For each vacancy on State board of health the State Medical Association nominates three members from whom the Governor appoints one.

2. County medical societies:

- a.* Number: 114; 119 counties in the State.
- b.* Meetings: Monthly.
- c.* Number of members: 2,250.
- d.* Efficiency: Reported majority effective.

3. District medical societies: Three or four doing effective work.

LOUISIANA

State System of Public Health

I. The State department of health.

1. State board of health:

- a.* Organized 1898.
- b.* Number of members: 7.
- c.* Appointed by the Governor, confirmed by the Senate.
- d.* Legal qualifications: Must be regularly qualified practitioner.
- e.* Term of office: Seven years, retiring in groups of two and three every two years.
- f.* Powers and duties:

(1) Section 3, Act 193 of 1898 instructs the State Board of Health to prepare a sanitary code for the State providing for the regulation of:

- (*a*) Land and maritime quarantine.
- (*b*) Reporting, care and management of cases of infectious and contagious diseases.
- (*c*) Reporting and tabulating vital and mortuary statistics.
- (*d*) Vaccination, making it compulsory only for public school children.
- (*e*) Carriage and transportation of persons, freight and dead bodies in so far as the same may affect the public health.
- (*f*) Food adulteration.
- (*g*) Inspection of meats, milk, coal oil and other articles affecting public safety.

- (h) Such health, sanitary and hygienic subjects as cannot be efficiently regulated by local boards. This code is given the force of law.
- (2) Act 98 of 1906 confers on the State board of health the powers:
 - (a) To revise the sanitary code incorporating rules and regulations governing the manufacture, sale and inspection of foods, liquors, waters and drugs.
 - (b) "To further revise and amend said Sanitary Code." These and the further revisions are given the force of law when they have been promulgated in same manner as required by existing law for Sanitary Code.

NOTE.—1. This gives to the State Board of Health full legislative, administrative and executive power.

2. The board meets quarterly, oftener if necessary, for the transaction of business. Three members constitute a quorum.

- g. Compensation: Each member allowed \$10 for each day of service and 5 cents mileage.
- 2. Executive officers:
 - a. Chief executive officer:
 - (1) Title: President State Board of Health.
 - (2) Appointed by the Governor.
 - (3) Term of office: Four years.
 - (4) Legal qualifications: Must be regular practitioner of medicine.
 - (5) Duties: Is executive and administrative officer of the board; has all the powers of the board when it is not in session.

(6) Compensation: \$5,000 per year.

b. Assistants:

(1) Secretary: Elected by the board; salary \$2,500 per year; custodian of records; edits the bulletin; acts in absence of the President.

(2) Medical Inspector: Elected by the board; salary about \$3,000; has supervision of infectious diseases.

(3) Food Commissioner: Elected by the board; salary \$2,500 a year; administers Pure Foods and Drugs Law.

(4) State Analyst: Elected by the board; salary \$2,000 a year.

(5) Four food and drug inspectors; salaries \$1,200, \$1,200, \$1,000, and \$900.

(6) Bookkeeper and recorder: Salary \$2,400 a year.

(7) State Bacteriologist: \$1,000 a year.

(8) Assistant medical inspector: Salary \$900 a year.

(9) Two stenographers: Salaries \$900 and \$700 a year.

(10) Janitor: \$720 a year.

3. State laboratory:

a. Located at New Orleans.

b. Established 1908.

c. Value of equipment: \$4,000.

d. For what used: Free diagnosis of specimens from cases of typhoid, tuberculosis, diphtheria, malaria and hookworm. Special problems of water and food, including milk.

e. Staff:

(1) Bacteriologist.

(2) Analyst.

f. Expenditures: No definite amount; expenses paid from general fund.

4. Available funds for State department of health:
 - a. Source: Legislative appropriations made biennially.
 - b. Total amount for 1909: \$25,000.
 - c. For what used: Salaries, traveling expenses, laboratory, educational work, general health measures.

II. Local health organizations.

1. Parish organizations:

- a. Parish board of health. Created by act of Legislature 1898. Composed of three members elected by the police jury, two members of which are members of the police jury and one is practicing physician who is the health officer. For Shreveport and Baton Rouge the Governor appoints two members of board.
- b. Term of office: Four years.
- c. Powers and duties:
 - (1) Has general control of public health matters in parish.
 - (2) Has power to make rules and regulations for the protection of public health in the parish. These rules and regulations have the force of law.
 - (3) Is under the general supervision of State Board of Health; must conform to its rules and regulations and co-operate in executing them.
- d. Compensation: Compensation of health officer fixed by police jury of parish; usually \$150 a year; some parishes allow extra compensation for special services.
- e. Number in State: 60. One in each parish in the State.

2. Municipal organizations:

- a.* City or town board of health: Prescribed by legislative enactment that the board shall be composed of five members, three of which shall be practicing physicians.
- b.* How appointed: Elected by the council or legislative body of the city or town. For Shreveport and Baton Rouge the Governor appoints three of the five members.
- c.* Term of office: Four years.
- d.* Duties: Same as for parish boards; have full powers, legislative and administrative, to control health officers of town or city; State board supreme.
- e.* Compensation: None.
- f.* Executive officer:
 - (1) Title: Health officer.
 - (2) Appointed: Elected by the city or town board of health.
 - (3) Term of office: Four years.
 - (4) Legal qualifications: Must be a duly registered and licensed physician.
 - (5) Duties: Is president of board; is executive officer of the board.
 - (6) Compensation: Fixed by municipality. In New Orleans, \$5,000; in Shreveport, \$2,100; in Alexandria, \$1,500; in other towns averaging about \$150 per year.
- g.* Number: One in practically every town having a population of over 500.

III. Medical societies.

- I. The State medical society:
 - a.* Name: Louisiana State Medical Society.
 - b.* Organized 1878.
 - c.* Number of members: 1,153.
 - d.* Meetings: Yearly.
 - e.* Attendance at meetings: Average about 350.
 - f.* Official connection with State department of health: None.

2. Parish medical societies :
 - a. Number: 41 out of a total of 60 parishes.
 - b. Meetings: Quarterly with two exceptions. In New Orleans parish, society meets bi-monthly; in Shreveport monthly.
 - c. Membership: Total membership about 1,000.
 - d. Efficiency: In large cities good; in small towns indifferent.
3. District medical societies: None; plans are being made for organizing them.
4. City medical societies: None; parish societies include cities.

IV. Other agencies.

1. Anti-tuberculosis leagues.
2. School improvement leagues.
3. Civic improvement leagues.
4. Public play-grounds associations.

MISSISSIPPI

State System of Public Health

I. State department of health.

1. State board of health:

- a.* Organized 1904.
- b.* Members: Thirteen.
- c.* Appointed by the Governor; one from each of the eight congressional districts; five from the State at large on nomination of State medical association.
- d.* Legal qualifications: Must be a physician of skill.
- e.* Term of office: Four years; term expires with Governor who appointed him.
- f.* Powers and duties:
 - (1) To supervise the health interests of the people of the State.
 - (2) To investigate the causes and means of prevention of endemic and epidemic diseases; the causes of mortality and the effect of localities, habits, employments and conditions upon public health.
 - (3) To investigate the sanitary condition of schools, prisons, public institutions, railroad and street cars and all places of public resort and to prescribe sanitary regulations for them.
 - (4) To require of county health officers, municipal boards of health, physicians, managers of schools, prisons, places of public resort such sanitary information as may be useful.
 - (5) To advise the State and all local governments on all hygienic matters.

- (6) To make and publish reasonable rules and regulations necessary to carry out the purposes of its creation; rules and regulations to be enforced by the county health officer in each county under the supervision and control of the State board of health.
- (7) To appoint county health officers and to remove same.
- (8) To prescribe and enforce quarantine regulations.
- g.* Compensation: \$3 a day of actual service and expenses.
- 2. Executive officers:
 - a.* Executive committee: Appointed by the board; composed of three of its own members; chairman designated by board; has authority to exercise all powers vested in the board.
 - b.* Chief executive officer:
 - (1) Title: Secretary State Board of Health.
 - (2) Appointed by the board.
 - (3) Term of office: Four years.
 - (4) Legal qualifications: A skilled and licensed physician.
 - (5) Duties: Executive officer of board; chairman of executive committee.
 - (6) Compensation: \$500 a year.
 - c.* Assistants:
 - (1) Bacteriologist: Salary \$1,500 a year.
 - (2) Stenographer: \$60 per month.
 - (3) Office boy.
- 3. State laboratory:
 - a.* Located at Jackson.
 - b.* Established October 1, 1910.
 - c.* Value of equipment: \$2,000.

- Digitized by Google

c. Efficiency: Some doing excellent work; others barely exist.

3. District medical societies: Several in the State; are doing the best work.

4. City medical societies: None.

IV. Other agencies.

1. Health leagues.

2. Civic associations.

3. Improvement associations.

NORTH CAROLINA

State System of Public Health

I. The State department of health.

1. State board of health:

- a.* Organized 1879.
- b.* Number of members: 9.
- c.* Appointed: Five by the Governor; four elected by the State Medical Society.
- d.* Legal qualifications: The four elected by the Medical Society shall be members of that society; of the five appointed by the Governor one must be a sanitary engineer.
- e.* Term of office: Six years; retire in groups of three.
- f.* Powers and duties:
 - (1) To take cognizance of the health interests of the people of the State.
 - (2) To investigate the sources of mortality, the effect of locations, employments and conditions upon the public health.
 - (3) To distribute information among the people about preventable diseases.
 - (4) To be the medical advisors of the State, to inspect the location, sanitary construction and management of all State institutions and to direct the attention of the State to such sanitary matters as in their judgment affect the industries, prosperity, health and lives of the people of the State.
 - (5) In times of epidemics of smallpox, yellow fever, typhoid fever, diphtheria, typhus fever, cholera, the State board shall have sanitary jurisdiction over all cities and

towns not having regularly organized local boards of health and has the power to make such regulations as it may deem necessary to protect the public health.

- (6) To inquire into any outbreaks of disease; to disseminate freely such advice as may be necessary to prevent or check diseases dangerous to public health.
- (7) Compensation: \$4 per day of actual service and traveling expenses.

NOTE.—Board has executive committee composed of the President, the engineer member of the board and one other member of the board elected; the executive committee has such powers and duties as may be assigned to it by the board.

2. Executive officers:

a. Chief executive officer:

- (1) Title: State Health Officer.
- (2) Appointed by the State board of health.
- (3) Term of office: Six years.
- (4) Qualifications: Must be a registered physician.
- (5) Duties: Is executive officer of the board; is secretary and treasurer of the board.
- (6) Compensation: \$3,000 per year and traveling expenses.

b. Assistants:

- (1) Director of State Laboratory of Hygiene; nominated by secretary and appointed by the board; salary \$2,500 a year.
- (2) Clerk; keeps the accounts and supervises reports; salary \$900 a year.
- (3) One stenographer for half time at \$300 a year.

3. The State laboratory:
 - a. Located at Raleigh.
 - b. Established 1905.
 - c. Value of equipment: \$3,000.
 - d. For what used: To make monthly analysis of all public water supplies; to make special analysis where danger threatens from either public or private water supplies; to examine specimens for tuberculosis, diphtheria, malaria, hookworm; to administer Pasteur treatment and distribute diphtheria antitoxin.
 - e. Staff: Director, chemist, assistant, stenographer, janitor.
 - f. Expenditures: About \$6,500 a year.
4. Available funds for work of department of health:
 - a. Source:
 - (1) Legislative appropriation: \$8,500.
 - (2) Revenue from special tax on public water supplies and fees for Pasteur treatment: About \$4,000.
 - (3) Total funds for 1909: About \$12,500.
 - (4) For what funds may be used: Salaries, office and traveling expenses, laboratories, educational work.

II. Local health organizations.

I. County organizations:

- a. Auxiliary board: Composed of all registered physicians resident in county; at the call of the chairman of the county board of supervisors is expected to advise the county authorities on all matters of public health. Reported to be ineffective.
- b. County sanitary committee:
 - (1) How constituted: Composed of the board of county commissioners together with two physicians, one selected by the chairman of the county board of commission-

ers and one by the mayor of the county town. The chairman of the county board of commissioners is ex officio chairman of the county sanitary committee. Term of office is coterminous with that of the commissioners with whom they serve; and when on duty they receive same compensation as county commissioners.

- (2) Duties: Shall have the immediate care and responsibilities of the health interests of the county. Make such rules and regulations, pay such fees and salaries and impose such penalties as they deem necessary to protect and advance public health. Rules and regulations have the force of law.

c. County superintendent of health:

- (1) Elected by the county sanitary committee.
In case of failure on part of county sanitary committee to elect, State board of health appoints.
- (2) Term of office: Two years.
- (3) Qualifications: Must be a registered physician in good standing, resident in county.
- (4) Duties:
 - (a) To carry out as far as possible such work as may be directed by the county sanitary committee and the State board of health.
 - (b) To have control of inland quarantine disinfections, abatement of nuisances and general sanitary supervision of the county.
 - (c) To make medico-legal post-mortem examinations for coroners' inquests, attend inmates of county home for the aged and infirm, jail, convict camp.

(d) To report to secretary of State board of health vital statistics, outbreaks of contagious diseases; reports contagious diseases to school authorities.

(5) Compensation: From \$20 to \$2,000 a year; sometimes paid fees; usually inadequate.

2. Municipal organizations:

a. City or town board of health: Usually appointed by board of aldermen; board elects municipal health officer. In many cities county superintendent performs duties of city health officer.

b. Term of office: Variable; from two to four years.

c. Duties: Administers quarantine, disinfection, vaccination, removal of nuisances and signs death certificates in certain cases.

d. Compensation: Compensation of municipal health officer variable; reported as being uniformly inadequate; officer frequently without special training, makes living by practice; health work a "side line."

III. Medical societies.

1. State Medical Society:

a. Name: The North Carolina Medical Society.

b. Organized about 1856.

c. Number of members: About 1,500 (3,000 physicians in State).

d. Meetings: Annual.

e. Attendance at meetings: 300 to 500.

f. Official connection with State department of health: Elects four of the nine members of the State board of health.

2. County medical societies:

a. Number: About 50.

b. Meetings: Usually monthly.

c. Number of members: Variable; from 6 to 67.

- d. Efficiency:* Reported as "some doing good work, many doing nothing."
- 3. City medical societies: Most cities of the State reported as having active and efficient medical societies.
- 4. District medical societies: Ten. About eight of these meet regularly and are effective.

IV. Other agencies.

- 1. Health leagues in many cities.
- 2. Betterment associations for the improvement of rural schools.

SOUTH CAROLINA

State System of Public Health

I. The State department of health.

1. State board of health:

a. Organized 1878.

b. Membership: The South Carolina Medical Association is the State board of health. The Executive Committee consists of one physician from each congressional district (seven in number); the Comptroller and Attorney General of the State; one member of the Pharmaceutical Association.

c. Appointed: Of the Executive Committee the Comptroller and Attorney General are members *ex officio*; one physician from each of the seven congressional districts is appointed by the Governor on recommendation of State board of health (South Carolina Medical Association); the pharmaceutical member is appointed by the Governor on recommendation of Pharmaceutical Association.

d. Term of office: Of appointed members, 7 years.

e. Powers and duties:

- (1) Is invested with all the rights and charged with all the duties pertaining to organizations of like character.
- (2) Is sole adviser of State in all questions involving protection of public health.
- (3) Investigates causes, character and means of preventing such epidemic and endemic diseases as the State is liable to suffer from.

- (4) Supervises quarantine systems of State; and with advice and consent of Governor has authority to establish and maintain quarantine by land and by sea.
- (5) Investigates influence of climate, location, occupations, habits, drainage, scavenging, water supply, heating and ventilation.
- (6) Inspects sanitary condition of all institutions supported at public expense.
- (7) Is authorized to provide and maintain a system for registration of vital statistics.
- (8) Enforces vaccination.
- (9) Co-operates with Federal Government and other States in establishing interstate quarantine lines and enforcing rules and regulations for protection of live stock industry of State.
- (10) Executive Committee reports to State board and State board reports to Legislature.
- (11) Exercises full power of supervision over local public health agencies.
- (12) Enforces Pure Food and Drugs Law. Special appropriation of \$1,000 for this purpose.
- (13) Administers law to secure pure water. All water companies, whether owned by private individuals, corporations or municipalities, are required to have water analyzed periodically at own expense by chemist and bacteriologist approved by State board of health.
- (14) Is authorized and empowered to divide the State into health districts and in those districts in which no boards of health exist to appoint sub-boards of health, which shall consist of two practicing physicians and one layman.

- Digitized by Google

manufactures virus; administers Pasteur treatment.

e. Staff: Director of laboratory, stenographer, janitor.

f. Expenditures: Paid out of general fund.

4. Available funds:

a. Source: Appropriation annually by Legislature.

b. Total appropriations for year 1909: Regular appropriation \$17,000; permission to exceed this limit by \$7,000 if necessary. The whole \$24,000 was used.

c. For what used: Funds may be used for all purposes deemed necessary by State board of health.

II. Local health organizations.

1. County organizations: None.

2. Municipal organizations:

a. City board of health; required by law in all incorporated towns and cities.

b. How constituted: Composed of five members in towns of 5,000 population or less; for towns and cities of over 5,000 population, of ten members; must not be members of council; one at least must be a physician.

c. Appointed: Appointed by mayor or intendant by and with the consent of the council.

d. Term of office: Five years, one member retiring each year.

e. Compensation: None.

f. Duties:

(1) Takes all necessary steps to control communicable diseases.

(2) Inspects schools and public buildings; has authority to regulate sanitary conditions of same.

(3) Full power to remove all unsanitary conditions prejudicial to public health.

- (4) Makes rules and regulations, which, when approved by city council, have force of law.
- (5) Co-operates in enforcement of State public health laws.
- (6) Reports to Executive Committee of State board of health.
- g.* City health officer: Elected by city board of health; salary fixed by board, ratified by council; is executive officer of the board.
- h.* Number of municipal organizations in the State: About 150.

III. Medical societies.

- 1. State medical society:
 - a.* Name: South Carolina Medical Association.
 - b.* Organized 1848.
 - c.* Number of members: 740.
 - d.* Meetings: Annually.
 - e.* Attendance at meetings: Last meeting, 211.
 - f.* Official connection with State board of health: Is the State board of health.
- 2. County medical societies:
 - a.* Number: 39 (43 counties in State).
 - b.* Meetings: Monthly, bi-monthly and quarterly.
 - c.* Number of members: 17 to 85 per cent of physicians in county.
 - d.* Efficiency: Reported as variable.
- 3. District medical societies: Five.
- 4. City medical societies: Five.

IV. Other agencies.

- 1. Federation of women's clubs.
- 2. County anti-tuberculosis leagues.
- 3. Health leagues in cities.
- 4. Civic improvement leagues.
- 5. State Charity Association.
- 6. Nurses' Association.

TENNESSEE**State System of Public Health****I. The State department of health.****1. State board of health.**

- a.* Organized: Established 1877; reorganized 1897.
- b.* Number of members: 4.
- c.* Appointed: Three physicians appointed by Governor; Commissioner of Agriculture, ex-officio member.
- d.* Legal qualifications: See above.
- e.* Term of office: Six years; Commissioner of Agriculture during his term of office.
- f.* Duties and powers:
 - (1) Has general supervision of health of people of State.
 - (2) Administers public health laws.
 - (3) Establishes and maintains quarantines when necessary.
 - (4) Supervises heating, ventilation and sanitation of public institutions and buildings.
 - (5) Administers by specific legislation Food and Drug Adulteration Act.
 - (6) Restricts and prevents contagious diseases.
 - (7) By special legislation administers Anti-spit Law for prevention of tuberculosis.
- g.* Compensation: \$10 per diem while engaged in actual service of board with traveling expenses.

2. Executive officers:*a.* Chief executive officer:

- (1) Title: Secretary.
- (2) Appointed: Elected by State board of health.
- (3) Term of office: Five years.

- (4) Legal qualifications: Must be a regular physician of skill and experience; bond of \$10,000.
- (5) Duties: Charged with the execution and enforcement of orders, rules and regulations promulgated by the board of health and the administration of all public health laws.
- (6) Compensation: \$2,400 per annum and traveling expenses.

b. Assistants:

- (1) Clerk of board.
- (2) Pure Food and Drugs Inspector provided for by specific statute.
- (3) One stenographer.
- (4) Special assistants employed by board when needed.

3. State laboratory: None.

4. Available funds for work of department:

a. Source: Legislative appropriation biennial.

b. Total budget for 1910.

OFFICE OF STATE BOARD OF HEALTH:

Salary of Secretary of the board.....	\$2,400
Salary of clerk.....	1,800
Salary of stenographer.....	900
Office expenses, stamps, telegraphing, telephoning, expressage, blanks, printing and stationery.....	500
Prevention and suppression of human epidemic diseases, to be used upon approval of the Governor.....	5,000

FOOD AND DRUGS INSPECTOR*

Salary of Pure Food and Drugs Inspector	\$2,500
Laboratory expenses, such as chemicals, renewals of apparatus, gas, water, etc.	500

* NOTE.—Food and Drugs Inspector is appointed by the Governor. The Department of Food and Drug Inspection is under the supervision of the State Board of Health.

For chemist.....	\$1,800
Amount for purpose of samples to be analyzed	1,200

Total available fund for all purposes.. \$16,600

- c.* For what funds may be used: "Regular Fund" for printing, stationery, postage, telegrams, telephone, current expenses of meeting of board. "Epidemic Fund" for control and prevention of human epidemic diseases.

II. Local health organizations.

I. County organizations:

- a.* Name: County Board of Health. Provided for in Act of 1885.
- b.* How constituted: Chairman, Judge of County Court. County Court Judge and County Court Clerk are ex-officio members of County Board of Health. County Court elects as a third member a competent physician, who is county health officer.
- c.* Duties: Has general supervision of health conditions in county. Enforces rules and regulations promulgated by State board of health.
- d.* Executive officer:
- (1) Title: County Health Officer.
 - (2) Appointed: Elected by County Court.
 - (3) Term of office: Four years.
 - (4) Duties: Is executive officer of county board and has general supervision of health conditions of county.
 - (5) Compensation: Fixed by County Court.
- e.* Number in State: One in each of the 96 counties of the State.

2. City organizations:

- a. City board of health: All cities and towns having a population of 5,000 or over are authorized to organize boards of health under Act of 1879.
- b. How constituted: Each city has its own method. In Nashville, board of health composed of three physicians appointed by mayor. City health officer elected by city board of health. Salary of health officer \$2,500 per year. Members of board serve without compensation. City of Nashville has bacteriological laboratory, milk and dairy inspection. City of Knoxville has board of health and city health officer, laboratory and milk inspection.
- c. Number of city and town health organizations in State: Twenty-one.

III. Medical societies in State.

1. State medical society:

- a. Name: Tennessee State Medical Association.
- b. Organized 1830.
- c. Number of members: 1,400.
- d. Meetings: One annually.
- e. Attendance: 200 to 300.
- f. Official relation to State health department: None.

2. County medical societies:

- a. Number: 67. There are 96 counties in State.
- b. Meetings: Some weekly; some bi-monthly; some monthly; some not at all.
- c. Number of members: In the 67 societies, 1,400. Average membership 21.
- d. Efficiency: Varying from complete inactivity to a very high degree of efficiency.

3. District medical societies:

- a. Number: Four—the Upper Cumberland, the East Tennessee, the Middle Tennessee and the West Tennessee societies.

b. Relation to State and county societies: No affiliation.

c. Efficiency: All very efficient bodies.

4. City medical societies: In the counties in which large cities are located the city societies and county societies are identical and have weekly meetings.

IV. Other agencies.

1. Anti-tuberculosis leagues in various cities.
2. Civic improvement leagues.
3. School improvement associations which give attention to sanitary conditions at public schools.

TEXAS

State System of Public Health

I. State department of health.

1. State board of health:

- a.* Organized —; reorganized 1909.
- b.* Number of members: Seven.
- c.* Appointed by the Governor.
- d.* Legal qualifications: Legally qualified practicing physician; graduate of reputable medical college; ten years' experience in practice of medicine.
- e.* Term of office: Two years.
- f.* Duties and powers:
 - (1) To have general supervision and control of all matters pertaining to the health of the citizens of the State.
 - (2) To make study of the causes and prevention of infectious and contagious diseases within the State.
 - (3) To have direction and control of quarantine.
 - (4) Is given power to prepare a Sanitary Code for Texas, which, when made, adopted, approved by the Governor, published and promulgated, shall have the force of law in all respects as far as relates to the following subjects:
 - (*a*) The management of quarantine and disinfection with respect to all contagious and infectious diseases.
 - (*b*) The government of quarantine and disinfection of all pestilential diseases, such as cholera, leprosy, bubonic plague, typhus and yellow fever.

- (c) Inspection, sanitation and disinfection of public carriers, places of public resort; the regulation of water, ventilation and heat in all such places.
 - (d) Governing the reporting by physicians and health officers of the presence in any locality of all contagious and infectious diseases.
 - (e) The collecting of vital and mortuary statistics.
 - (f) Governing transportation of dead bodies.
- (5) To prepare an advisory supplement to such Sanitary Code containing rules and regulations on the following subjects:
- (a) Fixing standard for disinfectants.
 - (b) Sanitary disposition of sewage.
 - (c) Interment and disinterment of dead bodies.
 - (d) Inspection of animals to be used for food products.
 - (e) The sanitary condition of slaughter-houses, meat-markets, dairies.
 - (f) Sanitation of public buildings.
 - (g) Sanitation of all food-markets and methods of marketing foods.

NOTE.—This advisory supplement is given the authority of law in cities and towns when adopted by majority vote of city council; and adoption by majority vote of commissioners' court gives it force of law in county outside of cities and towns.

- (6) Is given power to revise and amend Sanitary Code. Code and revisions have full force of law, with penalties attached.

- (7) The board and its members given full power to enforce public health measures.
- g.* Compensation: Ten dollars per day of actual service and 3 cents mileage.
- 2. Executive officers:
 - a.* Chief executive officer:
 - (1) Title: State Health Officer.
 - (2) Appointed by the Governor, confirmed by the Senate.
 - (3) Term of office: Two years.
 - (4) Legal qualifications: Legally qualified graduate of reputable medical college; skilled in public sanitation; ten years' experience in practice.
 - (5) Duties: President and executive officer of the board.
 - (6) Compensation: \$2,500 a year and traveling expenses.
 - b.* Assistants:
 - (1) Assistant health officer: Appointed by President of board with approval of the Governor; salary \$2,400 a year. (Office vacant at present for lack of funds.)
 - (2) Registrar of vital statistics: Secretary of board; appointed by President of board with approval of the Governor; salary \$1,800 a year.
 - (3) Chemist and bacteriologist: Must be learned in chemistry, pathology and bacteriology; appointed by the President of the board with approval of the Governor; salary \$1,800 a year. (Office vacant at present for lack of funds.)
 - (4) Inspector: To act as sanitary inspector; appointed by President of board; salary \$1,800 a year. (Office vacant at present for lack of funds.)

- (5) Stenographer and bookkeeper: Salary \$1,200 a year. Appointed as above.
 - 3. State laboratory: Provision made for laboratory, but it has not been opened on account of the lack of funds.
 - 4. Available funds:
 - a. Source: Legislative appropriation.
 - b. Total for last year, \$48,195.
 - c. For what used: \$12,000 of the appropriation is known as the general maintenance fund and can be used for general sanitary purposes. Remainder of fund is consumed in coast and border quarantine.
- II. Local health organizations.
- 1. County organizations:
 - a. How constituted: County health officer appointed by county Board of Commissioners.
 - b. Term of office: Two years.
 - c. Duties: Has charge of all public health matters in county outside of incorporated towns and cities. Under general supervision of State board of health.
 - d. Compensation: Fixed by Commissioners; average about \$300 to \$400 a year.
 - e. Number in State: About 230.
 - 2. Municipal organizations:
 - a. How constituted: City health officer appointed by city council; if city council neglects or refuses, then by State board.
 - b. Term of office: Two years.
 - c. Duties: Has charge of all public health matters in city under general supervision of State board.
 - d. Compensation: Fixed by city council; in larger cities about \$2,500 a year.
 - e. Number in State: About 280.

III. Medical societies.

1. State medical society:

- a.* Name: State Medical Association of Texas.
- b.* Organized 1868.
- c.* Number of members: About 3,300.
- d.* Meetings: Annually in May.
- e.* Attendance at meetings: 500 to 800.
- f.* Official connection with State department of health: None.

2. County medical societies:

- a.* Number: About 200.
- b.* Meetings: Bi-monthly to semi-annually.
- c.* Members: Variable.
- d.* Efficiency: From very good to mere existence.

3. District medical societies: 15 districts in State; practically all have societies; six of these in good condition.

4. City medical societies: None.

IV. Other agencies.

- 1. Civic leagues.
- 2. Women's clubs.

VIRGINIA

State System of Public Health

I. State department of health.

1. State board of health:

- a.* Organized —; reorganized 1908.
- b.* Members: Twelve.
- c.* Appointed by the Governor.
- d.* Legal qualifications: Must be a member of State medical association; one physician from each of the ten congressional districts of the State and two physicians from the city of Richmond.
- e.* Term of office: Four years, retiring in groups of three.
- f.* Powers and duties:
 - (1) To establish and maintain in city of Richmond suitable laboratories for examination of clinical material.
 - (2) To make research and studies of epidemics of infectious diseases and of methods of preventing and curing diseases.
 - (3) To establish and maintain at suitable place State sanitarium for treatment of tuberculosis.
 - (4) Is given power to make and promulgate rules and regulations for the protection of the public health of the State. These rules and regulations have the force of law with penalty for violation or refusal to obey.

NOTE.—The State board is thus clothed with all power needed.

- g.* Compensation: \$8 per day of actual service and 10 cents mileage.

2. Executive officers:

a. Chief executive officer:

- (1) Title: State Health Commissioner.
- (2) Appointed by the Governor.
- (3) Term of office: Four years.
- (4) Legal qualifications: Shall be a physician skilled in bacteriology and sanitary science.
- (5) Duties: Executive officer of the State; has all the powers of the board when it is not in session.
- (6) Compensation: \$3,500 a year.

b. Assistants:

- (1) Assistant Commissioner: Appointed by Commissioner; term four years; has charge of contagious and infectious disease work; looks after the bulletin; acts in absence of Commissioner.
- (2) Bacteriologist: Appointed by Commissioner; term of four years; has charge of laboratory; salary \$2,500.
- (3) Clerk: Appointed by Commissioner; salary \$1,200; detailed for duty at sanitarium.
- (4) Two clerks: One a stenographer, at \$600; janitor at \$320, who aids in laboratory.

3. State laboratory:

- a. Located at Richmond.
- b. Established 1908.
- c. Value of equipment: \$3,500.
- d. For what used: Free diagnosis of specimens submitted by physicians from cases of typhoid, tuberculosis, diphtheria, malaria, hookworm, special problems of water, foods and sewage.
- e. Staff: Bacteriologist and janitor.

NOTE.—The Pasteur Institute of Virginia is located in same building. This is a private

institution; makes diagnosis for rabies free.

f. Expenditures: No regular amount; funds are supplied as needed from general funds of department.

4. Available funds:

a. Source: Legislative appropriations; made biennially.

b. Total amount for 1909: \$40,000.

c. For what used: Salaries, traveling, laboratory, educational work, purchase and maintenance of sanitarium for tuberculosis, general health measures.

II. Local health organizations.

I. County organizations:

a. Name: County Board of Health.

b. How constituted: Five members; chairman of the Board of Supervisors is chairman of the board of health; clerk of the County Court is ex officio a member; three physicians are appointed by the judge of the Circuit Court; one of these three is selected secretary and executive officer. No term specified.

c. Executive officer: Elected by board from its own membership; term of 2 years; executive officer of board; compensation fixed by board with consent of Board of Supervisors.

NOTE.—Usually no regular compensation, but allowances for special services.

d. Powers and duties: Has general charge of sanitary officers of county; has control of prevention and eradication of contagious and infectious diseases, removal and quarantine of suspects; provides for com-

pulsory vaccination; power to adopt and enforce such rules and regulations as are necessary to effect these ends.

NOTE.—1. Powers limited by absence of penalties.

2. When county authorities fail to create health organization for county, State board of health may exercise the authority and appoint health officer.

2. Municipal organization:

a. How constituted: Varies according to charters of cities; usually city or town board of health with one member acting as health officer.

b. Appointed: Board usually appointed by city council.

c. Term of office: Varying from two to four years.

d. Duties: Usually have full power to control sanitary affairs of municipality.

e. Compensation: Varies; usually very small; paid to physician who devotes his time to private practice. Richmond and Norfolk have active, efficient departments of health.

III. Medical societies.

1. State Medical Society:

a. Name: Medical Society of Virginia.

b. Organized —.

c. Number of members: About 1,300 (2,000 physicians in State).

d. Meetings: Annually.

e. Attendance at meetings: Usually from 300 to 500.

f. Official connection with State department of health: None. Unofficial relations intimate and cordial.

2. County medical societies:

a. Number: Sixteen (one hundred counties in State).

b. Meetings: Usually monthly.

c. Numbers of members: Vary widely.

d. Efficiency: Some reported doing excellent work, some as almost defunct.

3. District societies: District medical societies embrace practically the whole State; reported that most of them are in healthy condition.

4. City medical societies: Practically every city in the State has a thriving medical society; those in the larger cities are very influential.

IV. Other agencies.

1. Health leagues in many cities.

2. Civic improvement leagues in many cities; neighborhood improvement leagues in some counties.

I.—*Organization and Constitution of State Board of Health.*

	When organized.	Number of members.	How appointed.	Legal qualifications.	Term of office.	Does State board elect health officer?	Authority of sanitary code.	Powers over local health organizations.
Alabama	1873	10*	Elected by medical association.	Members of medical association.	5 years, retiring in groups of 2.	Yes.	Limited.	General supervision.
Arkansas	1881	6	By Governor.	All physicians; majority graduates; 7 years' experience.	2 years.	Yes.	Limited.	General supervision.
Florida	1889	3	By Governor, confirmed by Senate.	Discreet citizens. In practice, one a physician.	4 years.	Yes.	Force of law.	Full control.
Georgia	1903	12	By Governor.	Licensed physician; 1 from each congressional district.	6 years, retiring in groups of 2.	Yes.	Limited.	General supervision.
Kentucky	1904	8	By Governor, confirmed by Senate.	Licensed physician.	6 years.	Yes.	Limited.	Direct supervision.
Louisiana	1898	7	By Governor, confirmed by Senate.	Licensed physician.	7 years, retiring in groups of 3.	No.	Force of law.	Direct supervision.
Mississippi	1904	13	By Governor.	Licensed physician; 1 from each congressional dist.; 5 others.	4 years.	Yes.	Limited.	Direct supervision.
North Carolina	1879	9	5 by Governor, 4 by medical society.	4 members of medical society, 1 sanitary engineer.	6 years, retiring in groups of 3.	Yes.	Limited.	General supervision.
South Carolina	1878	10*	8 by Governor, on recommendation of State Med. Asso.; 2 ex officio.	8 medical society members, 1 pharmacist, 2 ex officio.	7 years.	Recommendations.	Limited.	General supervision.
Tennessee	1897	4	3 by Governor; 1 ex officio.	3 licensed physicians.	6 years.	Yes.	Limited.	General supervision.
Texas	1909	7	By Governor.	Licensed physician, 10 years' experience.	2 years.	No.	Force of law.	General supervision.
Virginia	1908	12	By Governor.	Member of State medical association from each cong. district; 2 from Richmond.	4 years, retiring in groups of 3	No.	Force of law.	General supervision.

* This number refers to Executive Committee. The State Board is composed of entire State medical association.

II.—*State Health Officer.*

State.	Title.	How appointed.	Term of office.	Legal qualifications.	Powers.	Compensation.
Alabama	State Health Officer.	Elected by Public Health Committee.	5 years.	Member of College of Councilors in State Medical Association.	Executive officer of the Board.	\$5,000
Arkansas	Secretary of State Board of Health.	By Board.	2 years.	Skilled in sanitary service.	Executive officer of the Board.	000
Florida	Secretary and State Health Officer.	By Board.	4 years.	Expert in public health and sanitary science.	Executive officer of the Board.	3,000
Georgia	Secretary and Director of Laboratories.	By Board.	6 years.	Not mentioned.	Executive officer of the Board.	2,000
Kentucky	Secretary.	By Board.	4 years.	Legally qualified practitioner.	Executive officer of the Board.	1,200
Louisiana	President State Board of Health.	By Governor.	4 years.	Registered practitioner.	All powers of the Board when not in session.	5,000
Mississippi	Secretary of State Board of Health.	By Board.	4 years.	Skilled licensed physician.	Executive officer of the Board.	500
North Carolina	State Health Officer.	By Board.	6 years.	Registered physician.	Executive officer, sec'y and treasurer of the Board.	3,000
South Carolina	Secretary and State Health Officer.	By Governor, on recommendation of Exec. Com.	At pleasure of Exec. Com.	Skilled in hygiene and sanitary science.	All powers of Board when not in session.	2,500
Tennessee	Secretary.	By Board.	5 years.	Physician of skill and experience.	Executive officer of the Board.	2,400
Texas	State Health Officer.	By Governor, confirmed by Senate.	2 years.	Skilled in public sanitation, 10 yrs. in practice.	President and executive officer of the Board.	2,500
Virginia	State Health Commissioner.	By Governor.	4 years.	Skilled in bacteriology and sanitary science.	All powers of Board when not in session.	3,500

III. — *Force and Funds of State Department of Health.*

State.	Total staff.	Value of laboratory equipment.	Laboratory staff.	Source of funds.	Total available annual funds.	Remarks.
Alabama	8	\$3,000	4	Legislative appropriation.	\$16,000*	
Arkansas		No laboratory.				
Florida	19 Local rep. 25 43		11	Mill tax.	75,000	3 laboratories, well equipped.
Georgia	12	25,000	10	Legislative appropriation.	21,500	
Kentucky	2			Legislative appropriation.	5,000†	Appropriation recently made for laboratory.
Louisiana	15	4,000	2	Legislative appropriation.	25,000	
Mississippi	4	2,000	2	Legislative appropriation.	8,000	
North Carolina	8	3,000	5	Legislative appropriation. Special tax on public water supplies. Fees from Pasteur treatment.	12,500	
South Carolina	7	3,000	3	Legislative appropriation.	24,000	
Tennessee	4			Legislative appropriation.	16,000‡	
Texas	3			Legislative appropriation.	48,195	Only \$12,000 of total fund available for general maintenance.
Virginia	7	3,500	2	Legislative appropriation.	40,000	

* \$20,000 additional available for quarantine purposes in case of epidemics.

† \$10,000 available in case of outbreak of cholera or yellow fever.

‡ \$10,000 for two years. Special fund in case of epidemic.

SUMMARY OF FACTS AND OBSERVATIONS

1. In Florida, Kentucky, and Louisiana, members of the State board of health are appointed by the Governor and the appointment confirmed by the Senate; in North Carolina 5 members are appointed by the Governor and 4 by the State Medical Society; in South Carolina 8 of the 10 members are appointed by the Governor on the recommendation of the State Medical Society. This method of appointing members of the State board of health has a twofold merit:

a. By giving the Governor a voice in the appointment of the board it recognizes the executive head of the State as responsible to the people for the efficiency of every department of the public service; it tends to make the State system of public health responsible to the public which it serves. In the appointment of its State board of education New York State seems to accomplish the same end successfully by having the board appointed by the Legislature.

b. Requiring that appointments be confirmed by the Senate or that they be made on the recommendation of the State Medical Society tends to provide against arbitrary use or abuse of the appointing power. In the discharge of its duties it frequently becomes necessary for a State board of health to be courageous in the exercise of its power; it is of the utmost importance that it be protected from undue political interference. How this interest may be further safeguarded is illustrated under the next head.

2. In North Carolina the State board of health has 9 members holding office for 6 years and retiring in groups of 3. Long term of service with members retiring in small groups guarantees that degree of continuity which is necessary to effective service; it serves also as an effective safeguard against undue political interference. This principle is embodied with varying degrees of effectiveness in the State boards of Virginia, North Carolina, Louisiana, Georgia, and Alabama.

3. In Alabama, Arkansas, Florida, Georgia, Kentucky, Mississippi, North Carolina, and Tennessee the State board elects its own executive officer. Giving the board this authority has the virtue of centering responsibility and power in the same administrative body. If the board be held responsible for the service, it should have the power to select its executive agent; to fix his salary; to keep him at his post as long as he is efficient.

4. In Florida, Louisiana, Texas, and Virginia the State board of health has been given the power to make and promulgate a sanitary code having the full force of law; to revise the code at discretion; to enforce the code that it promulgates. This tends to make the power of the board commensurate with its responsibilities. It is difficult to see how any State board can effectively conserve the life and health of the people until it has been thus clothed with full administrative power.

5. The Florida public health fund is on a mill basis and yields this year about \$75,000. Thus the fund is stable; it is adequate; it grows with the needs of the State. Having a definite fund, the board can look far ahead and make definite plans to be carried out through a long series of years. In definitely giving its State board of health full administrative powers and providing it with an adequate fund on a mill basis, the State of Florida sets a high standard.

6. The compensation allowed the State health officer ranges from \$500 in Mississippi to \$4,500 in Alabama and Louisiana. The salary paid the health officer is not the measure of efficiency in the service, but efficient service does require sufficient compensation to justify a competent man in devoting his whole time to the work.

7. One of the most striking features of these State systems of public health is the inefficiency of the county health service. To secure best results in the county service at least two things would seem necessary:

a. It would seem to be desirable and possible to organize the county board of health in a way to stimulate and utilize

local initiative under effective control. The parish health board in Louisiana seems to embody this principle in that it is given the power to make rules and regulations for the protection of health in the parish; the rules and regulations have the force of law; and yet the parish board is under the general supervision of the State board, must conform to its rules and regulations, and must co-operate in executing them.

b. It seems evident enough that there can be no effective health service in the county on any basis until there is in the county *a capable health officer devoting his whole time to the service.*

In most States the county health officer is a practicing physician; he is paid an insignificant sum to look after the health interests of the county, but must depend for the support of himself and his family upon his private practice; it is not his fault that the service is not effective. In some of the States the county health officer is paid by a fee system. The work is not going to be done until the man is paid an adequate salary for his services and is required to devote his whole time to the work.*

WASHINGTON, D. C., December, 1910.

* Since this manuscript was written the Legislature of North Carolina has enacted a law authorizing the county to employ a county superintendent of health for his whole time, and to pay him a salary. I am advised that two counties have used the authority thus granted, and now have superintendents of health devoting their whole time to the work.

RC 248
R5
(PUBLICATION NO. 5)

THE ROCKEFELLER SANITARY COMMISSION
FOR THE
ERADICATION OF HOOKWORM DISEASE

Second Annual Report

OFFICES OF THE COMMISSION
WASHINGTON, D. C., U. S. A.

1911

Digitized by Google

THE ROCKEFELLER SANITARY COMMISSION

FOR THE

ERADICATION OF HOOKWORM DISEASE

SECOND ANNUAL REPORT

OFFICES OF THE COMMISSION

WASHINGTON, D. C., U. S. A.

1911

THE ROCKEFELLER SANITARY COMMISSION

F. T. GATES

Chairman

WILLIAM H. WELCH

SIMON FLEXNER

E. A. ALDERMAN

D. F. HOUSTON

P. P. CLAXTON

WICKLIFFE ROSE

Administrative Secretary

725 Southern Building

Washington, D. C.

J. Y. JOYNER

WALTER H. PAGE

H. B. FRISSELL

J. D. ROCKEFELLER, JR.

STARR J. MURPHY

C. W. STILES

Scientific Secretary

24th and E Sts. N. W.

Washington, D. C.

•
L. G. MYERS

Treasurer

CONTENTS.

CHAPTER I.—Outline statement of activities and results by the
Administrative Secretary.

CHAPTER II.—Summary of activities and results by States.

CHAPTER III.—General summary.

CHAPTER IV.—Exhibits.

CHAPTER V.—Report of the Scientific Secretary.

CHAPTER I.

OUTLINE STATEMENT OF ACTIVITIES AND RESULTS BY THE ADMINISTRATIVE SECRETARY.

The report of the Administrative Secretary for the year 1910 defines the work to be done; it gives an account of the organization of the agencies that are doing the work; it exhibits these agencies in action and gives in detail the methods of work in each line of activity pursued. The present report will record in detail only the new developments for the present year and will summarize the activities and results.

I. The working agency for 1911.—The organization as outlined in the report for 1910 has continued; it has grown in size, but we have had no occasion to change its form. Tabular statement No. 1 exhibits the present working force by States.

II. The organization at work.—All lines of activity as exhibited in the report for 1910, with important additions, have been pursued during the present year. The work in each State is directed as hitherto toward three tasks: determining the distribution and degree of infection; getting the people treated; removing the cause of infection by putting a stop to soil pollution.

1. Determining the distribution and degree of infection.—To this end we are conducting three types of survey:

(1) The preliminary survey.—The methods of this work are given in detail in the report for 1910. The results for the

TABLE No. I.
PERSONNEL.

State.	Director.	Stenographer.	Laboratory Force.	Field Force.
Alabama.....	W. W. Dinsmore....	Miss Perry.....	Dr. George Ives..... Mr. Wm. Henderson....	Dr. J. F. Orr. H. G. Perry.† W. W. Perdue. J. B. Crawford.† T. B. Bradford. T. M. Fly. C. W. Garrison. W. C. Thompson.† A. W. Wood. P. H. Fitzgerald. C. R. Henry. C. H. Dobbs. C. H. Verner.† S. H. Jacobs. C. B. Greer.† T. F. Abercrombie. G. B. Randall.† W. W. Richmond. I. A. Shirley. J. S. Lock. T. E. Wright. A. S. J. Hyde.† G. B. Adams. J. A. Azar. G. R. Fox. R. Rowland. W. H. Rowan. C. R. Stingily. R. N. Whitfield. H. Boswell.
Arkansas.....	Morgan Smith.....	Miss Lillie Hill.....		
Georgia.....	A. G. Fort.....	Miss Edna Whaley.....	Dr. C. E. Pattillo. L. T. Pattillo.....	
Kentucky†.....	A. T. McCormack....	Miss Clyde Howell.... Hattie Funk..... Fant.....	Miss L. Sigmeier..... Mrs. M. Havard..... Dr. L. H. South*.....	
Louisiana.....	S. D. Porter.....	Miss F. B. Nelken.....	Dr. W. H. Seeman.....	
Mississippi.....	W. S. Leathers.....	Mr. J. S. Hoskins..... Mrs. E. A. Stephenson.. Mrs. Russell.....	Dr. H. B. Wood*..... C. C. Buchanan..... Mrs. H. Boswell..... Mr. Goodman.....	

North Carolina.....	J. A. Ferrell.....	Miss Inez Reynolds.....	Dr. C. A. Shore*..... C. F. Kirkpatrick..... F. W. Connor..... J. J. Mackey..... W. C. Riddick..... Mrs. C. L. Pridgen..... L. H. Swendell..... L. M. Hales..... Durfee..... Dr. F. A. Coward..... Mr. J. R. Cain..... A. S. Williams.....	B. W. Page.† C. F. Strosnider. C. L. Pridgen. P. W. Covington. T. E. Hughes.
South Carolina.....	J. La Bruce Ward...	Miss S. D. Pinckney.....	E. C. Baynard.† F. A. Bell.† M. Weinberg. F. M. Routh. J. T. Howell. F. D. Rodgers. A. M. Brailsford.† J. B. Lansden. W. M. Breeding.† J. M. Lee. T. B. Yancey. W. J. Breeding. T. E. Lacey. H. G. Tartar. W. A. Plecker. W. A. Brumfield. A. C. Fisher. R. C. Carnal.†	E. C. Baynard.† F. A. Bell.† M. Weinberg. F. M. Routh. J. T. Howell. F. D. Rodgers. A. M. Brailsford.† J. B. Lansden. W. M. Breeding.† J. M. Lee. T. B. Yancey. W. J. Breeding. T. E. Lacey. H. G. Tartar. W. A. Plecker. W. A. Brumfield. A. C. Fisher. R. C. Carnal.†
Tennessee.....	Olin West.....	Dr. Herman Spitz.....		
Virginia.....	A. W. Freeman.....	Miss I. V. Goddin.....	Dr. A. P. Berger..... Mr. J. O. Fitzgerald..... C. G. Willis.....	

* State Bacteriologist.

† Resigned.

‡ Organized December 6, 1911.

two years are here exhibited on maps I to II. In addition to the States represented on the maps, infection has been demonstrated in Florida, California, Nevada, Oklahoma, West Virginia, with very strong clinical evidence of its presence in Maryland. Infection has been demonstrated in 93 of the 100 counties in Virginia; in 99 of the 100 counties in North Carolina; in 140 of the 146 counties of Georgia; in every county in South Carolina; in 66 of the 67 counties in Alabama; in 77 of the 79 counties in Mississippi; in 27 of the 59 parishes in Louisiana; in 57 of the 75 counties in Arkansas; in 95 of the 96 counties in Tennessee; in 22 of the 119 counties in Kentucky. Of the 884 counties in these ten States, infection has been demonstrated in 719; the remaining 165 counties have not been surveyed.

This preliminary survey shows (see maps) a heavy infection on the sandy costal plain extending through the eastern part of Virginia, North Carolina, South Carolina, the southern part of Georgia, Alabama, and Mississippi. In many of the counties in this belt the infection is extremely severe. In one such county I visited three public schools in succession in which microscopic examination showed every pupil and the teacher infected. In Louisiana, the heavier infection has been found thus far near the Florida line and in the hilly regions of north Louisiana; in Arkansas the survey has been confined mainly to the southern part of the State, where a heavy infection has been demonstrated; in Tennessee the heavier infection has been found in the coves, on the slopes, and extending even to the plateau in the western portion of the Cumberland Mountain region. The record of this preliminary survey is subject to correction by the more thorough survey which is now under way.

(2) **Definite survey to determine degree of infection.**—In February of the present year, the State directors in conference in Atlanta agreed upon a uniform plan of survey, to determine the degree of infection for a selected group of the population. The survey is made by counties; it is based on a microscopic examination of faecal specimens from at least 200 children between the ages of 6 and 18, taken at random—that is, without reference to clinical symptoms—from rural districts distributed over the county. The record shows the number of children examined, the number found infected, the per cent of infection. This result is taken as an index to the degree of infection among children between the ages of 6 and 18, living in the rural district in the given county.

This body of definite information serves a twofold purpose: given to county boards of education, to boards of commissioners, and to the people, it furnishes a definite basis for action; by making a similar survey from time to time, it gives a definite measure of progress in the work of eradicating the disease.

This survey is being made in connection with the other work. The results of the work thus far are exhibited as a part of the State reports. The survey has been completed for 87 counties in nine States; the result shows an infection among the rural children from 6 to 18 years of age in these counties ranging in degree from 2.5 to 90.2 per cent.

In the beginning of the work, two years ago, the discovery of heavy infections was discouraging; after two years of experience the record of a heavy infection has the opposite effect. Where the infection is heavy it is much easier to awaken interest; to get the people to see what the presence of the infection means; to get them to appropriate money for the

dispensaries; to secure coöperation in getting the people examined and treated; to secure definite action in the interest of better sanitation to prevent reinfection. These communities where the infection is heavy are going to be the first to throw it off; they are going to lead in the improvement of sanitary conditions, which, while stamping out hookworm disease, will at the same time bring under control typhoid, amœbic dysentery, and other enteric diseases.

(3) **Survey of foreign countries.**—The Commission has undertaken to get information on the disease in foreign countries. A letter was prepared asking for information on: 1. whether or not the country has been found infected; 2, the geographic distribution of the infection within the country; 3, an approximate estimate of the degree of infection; 4, whether the infection is surface or mine infection; 5, what is being done by private or public agencies to eradicate or relieve it. Through the good offices of the late Surgeon General Wyman this letter was sent out by the Department of State with a covering letter as an official inquiry to American representatives in all foreign countries. This was followed by correspondence with physicians and public-health authorities in these countries; these reports were supplemented by reference to the voluminous literature of the subject on file in the library of the Surgeon General's office, U. S. Army. The information thus gained is summarized in Publication No. 6,* "Hookworm Infection in Foreign Countries."

Some features of the exhibit in Publication No. 6 call for special attention in this report:

* The Rockefeller Sanitary Commission, 725 Southern Building, Washington, D. C.

a. Extent of the infection.—Hookworm infection belts the earth in a zone about 66 degrees wide, extending from parallel 36° north to parallel 30° south; practically all countries lying between these two parallels are infected.

Of the foreign countries from which the Commission has received reports, 54 are infected. In six of these countries—Wales, Germany, Netherlands, Belgium, France, and Spain—the infection is wholly or chiefly confined to mines, and is found in but few definite localities; in at least 46 of these countries the infection is general and widespread. Exhibit on page 89 shows that these 46 countries comprise an area of about 14,464,158 square miles and have a population of about 919,858,243. To this we may add 11 of our own States, with an area of 510,149 square miles and a population of 20,785,777. Of the total population of the globe—about 1,600,000,000 people in round numbers—about 940,000,000 live in countries where hookworm disease is prevalent.

b. Degree of infection.—In many countries the infection is extremely prevalent. In 1904 it was estimated that 90 out of every 100 of the working population of Porto Rico were infected. My own observations in the island convince me that this estimate was not excessive. The reports summarized in Publication No. 6 estimate: That of the whole population of Colombia living between sea-level and 3,000 feet above, 90 per cent are infected, and this includes the great majority of the 5,000,000 of people living in this country; that of the total population of British Guiana, 50 per cent are infected, the percentage of infection among the laborers on the sugar estates being much greater; that in Dutch Guiana the infection on many plantations runs as high as 90 per cent; that over a thousand microscopic examinations in French Guiana showed

an infection of 35 per cent among a local population, 50 per cent among soldiers, and from 50 to 88 per cent among prisoners; that in Egypt general estimate places the infection at 50 per cent of the laboring population; that 50 per cent of the coolie laborers on sugar and tea estates in Natal are infected, with the disease spreading among natives and Europeans; that on many plantations in Ceylon the infection runs as high as 90 per cent; that of the 300,000,000 of people of India, 60 to 80 out of every 100 harbor the parasite; that on rubber plantations in the Malay States the infection runs from 47 to 74 per cent; that the southern two-thirds of the Chinese Empire is involved with the infection in many places in the Yang-tse Valley running as high as 70 to 76 per cent among the farming population; that of the entire population of American Samoa, about 70 per cent are infected.

c. Economic significance of the disease.—The economic loss resulting from the disease is enormous. The physically sound coffee-picker in Porto Rico picks from 500 to 600 measures of coffee per day; scores of anemics told me they could pick only from 100 to 250 measures per day. According to estimates given me by the managers of a number of large haciendas in Porto Rico, the disease has reduced the average efficiency of the labor on these plantations to from 35 to 50 per cent. Dr. William M. McDonald reports that the disease is "sapping the life and energy of the population of Antigua." Dr. Parker, of Ecuador, says: "Last fall I visited one of the largest cocoa plantations near Babahoyo and found that the anemias of hookworm and chronic malaria made available not more than 33 per cent of work of the 300 laborers on that place." Dr. E. Brimont reports: "The disease has greatly retarded the development of French Guiana." The report

from British Guiana says: "The economic loss due to hookworm disease on the sugar estates is heavy. On one estate, where the laborers were treated on a large scale, the manager reported that 'the working power of the gangs had increased 100 per cent.'" The report from Colombia, after stating that the infection is among the miners and in abundant profusion throughout the agricultural sections, where the laborers on the coffee, sugar, rubber, tobacco, banana, and other plantations are seemingly all affected, says that "one of the greatest problems with which the people of Colombia are confronted at the present time is that of the evils attendant upon the presence of hookworm infection." Dr. T. F. McDonald, of Queensland, reporting conditions in the Johnstone River district, says that infection is present in every square mile of it, and that "it is sucking the heart's blood of the whole community." The Right Honorable the Earl of Crew, Secretary of State for the Colonies, in his dispatch on this subject to the Governor of Ceylon, says: "Having considered the reports from the several colonies, with the observations of the committee upon them, I recognize that the loss of labor caused by the prevalence of ancylostomiasis is very serious, and affects prejudicially not only the employers of labor, but the community at large. Not only is there serious loss of life, direct and indirect, but also through the invaliding of laborers the charges for hospital and pauper expenditures are largely increased." In 1908 Dr. Bradon examined 2,000 sick Tamils on the rubber estates in Negri Sembilan, Malay States, and says "there was no single one of these coolies who was not affected by ancylostomiasis"; "that 60 per cent of all coolies *at work* were in an advanced state of ancylostomiasis." Dr. Graham, reporting for Lower Perack, Malay States, says that more than 50 per cent of the

entire population is infected and that the disease is of "great economic importance to the rubber industry."

In our own country Dr. Herbert Gunn, special inspector for the California State Board of Health, in his report on hookworm infection in the mines of that State, says: "There is no question that the general efficiency of the men is noticeably impaired. At one mine, employing about 300 laborers, it was stated that a reserve of about 25 men had to be available to replace those who, on account of sickness, did not appear for work. Quite a few of the men have to lay off every now and again to recuperate. Several who were unable to work stated that when they arrived in Jackson they were perfectly strong and well. A large number of these men were encountered on the streets, some of them presenting marked degrees of anemia. The greatest loss to mine operators is occasioned by the large number of those moderately affected. * * * A loss of 20 per cent in efficiency of those infected would be a conservative estimate. That would mean in Mine No. 2, for instance, where over 300 men are employed at an average of about \$2.50 per day, and estimating the number of those infected as low as 50 per cent, a loss of over \$20,000 a year."

This estimate is for *one mine*. Dr. Gunn reports "that infection undoubtedly is present in practically all of the gold mines of California. Infection is present, also, among agricultural laborers of that State.

But the infection in California is light as compared with nine or ten of our South Atlantic and Gulf States, with their 20,000,000 of people. If an infection of 50 per cent in one gold mine employing 300 men causes a loss conservatively estimated at over \$20,000 a year, what must be the economic significance of this disease for India, with its 300,000,000 of people and from 60 to 80 per cent of them infected?

d. Retarding effect on education and civilization.—We have on file a photograph of a group of children, no one of whom until this year had ever been in a school; no member of their parents' family, of their grandparents' family, or their great-grandparents' family on either side had ever gone to school. We have in this family a record of at least four generations of illiteracy due to the disabling effects of hookworm disease. In the community in which this family lives are many other families showing a similar history. I have visited many communities in which a large proportion of the children have been kept out of school by disability due to this cause. I have visited schools and have on file records of many others in which all or a large proportion of the children attending are infected. Records of the definite survey show in extreme cases an average infection among rural children of school age for whole communities running as high as 70 to 90 per cent.

The statement by Dr. E. Brimont, that "the disease has greatly retarded the development of French Guiana," is applicable even in greater degree to many other countries. Acute disease may strengthen a race by killing off the weak; but hookworm disease is chronic. It works subtly through long periods of time, and its cumulative results—physical, intellectual, economic, and moral—are handed down as an increasing handicap from generation to generation. The letter on page 119, showing the effects of the disease on one community, is a statement in concrete miniature of what it means in the large. This letter portrays a situation which for our States is extreme; but many countries, like Egypt, India, and China, have suffered a heavy infection for centuries, and its results have been handed down from generation to generation for ages as a cumulative handicap to the development of these people in all things that make for civilization.

e. Spread of the infection by immigration.—It is estimated that from 60 to 80 per cent of the total population of India are infected. Every country importing coolie laborers from India is bringing on to its own soil a heavy stream of infection. In Assam Dr. Bently examined 600 Indian coolies just arrived, and found only one of them free from infection. When the attention of the government at Durban was called to the heavy infection among the coolie laborers on the sugar estates of Natal in 1908, the authorities examined the next shipload of coolies from India and found 93 per cent of them infected. The Indian coolie is the chief source of labor supply for British Guiana; examination of all coolies arriving for the year 1909 showed an average infection of 74.44 per cent; this importation of coolie labor is regarded as the source of the present extremely disastrous infection in that country. About 16,000 Indian coolies have been imported into Jamaica, and it is estimated that 50 per cent of them are now infected. By the importation of coolie labor the infection has been carried and is being carried from India also into Dutch Guiana, Ceylon, the Federated Malay States, the Straits Settlements, and Java. The health authorities at San Francisco examined a shipload of Indian coolies just arrived at that port last year, found an infection of about 90 per cent, and established quarantine against further immigration of this type. Every group of Indian coolies now in California is a center from which the infection is spreading in that State. From the outbreak of the disease in the St. Gothard tunnel the infection was carried into the mines of Austria, Belgium, and Germany. In these countries large sums have already been spent in a systematic effort for its eradication.

These, among a multitude of similar facts, suffice to show

that hookworm disease, in the light of our present knowledge, has ceased to be a local matter; it is an international problem of serious proportions.

2. **Getting the people treated.**—In getting the people treated, the work in each State this year has followed two lines of effort:

(1) **Enlisting the physicians in the work.**—The activities outlined in the report for 1910 have been kept up; the results are tabulated as a part of each State report and are summarized on page 68. Of the 21,244 practicing physicians in these nine States, 4,126 have reported treating the disease. The report from North Carolina shows that of the 1,879 physicians in that State, 1,195 are treating the disease. The physicians reporting as enlisted in the work have treated during the year 53,167 persons.

(2) **Getting the people to seek examination and treatment.**—When the work began two years ago the people did not know hookworm disease as a disease. The announcement of its prevalence they had not taken seriously. It was extremely difficult to induce them to be examined, and even more difficult to get them when found infected to consent to treatment. The physician could not treat them until they had been shown that it was to their interest to seek his aid. For two years systematic effort has been made to give them the facts. The educational activities outlined in the report for last year have been persistently pursued in each State; the people have been taught by public lectures with charts and lantern slides, by bulletins and folders, by the public press, by exhibits at State and county fairs, by the examination of children in the schools and students in the colleges, by examinations made at

the State laboratories, by the celebration of public-health day; and most effective of all has been the teaching of the people by demonstration through the treatment of large numbers at the county dispensaries.

a. The county dispensary.—The county dispensary is a development of the present year. The first dispensary was opened by Dr. C. J. Cully, at Columbia, Mississippi, on December 15, 1910, and was referred to in our annual report for the year as "the most promising move that has been made in the direction of supplying treatment for the indigent." In its surprising development during the present year we have almost ceased to think of it as a means of supplying treatment to the indigent in view of its incomparably greater value as an agency for teaching all the people by demonstration.

The work of the county dispensaries in each State is conducted by members of the field staff under the general supervision of the State director of sanitation for the State department of health; all local expenses are borne by county funds. The work in a given county continues from 6 to 8 weeks; it is intensely educational from beginning to end; it reaches the entire population of the county, reaches over into the adjoining counties, and makes its influence felt on the State as a whole.

When the physician in charge goes into a new county to open up the work, the way has been prepared for him; the people in this new county have heard of what has been done in the adjoining county; a personal letter has been sent from the central office to the physicians and county officials calling attention to the work and asking that the State board's representative be given coöperation; the field physician is armed with a letter from the commissioners' court in the county in

which he has just been working, stating what appropriation this court had made for the work and what had been accomplished; he has also a letter from the physicians in the county in which he has been working, stating what the work has done for the people and how it has increased their own practice in treating the disease. With this preparation the work for the county begins.

(a) *Getting coöperation of physicians.*—The field director visits each physician in the county and gets him to sign a resolution endorsing the plan of work for the county and pledging his coöperation. The physicians as a rule give both moral support and active coöperation. On a recent visit to a dispensary my attention was called to a physician who had treated only 4 cases of hookworm disease before the opening of the dispensary in his county; on the day before my visit he had treated 16 cases in his regular practice. Recent report from one county shows that while the physician in charge of the dispensary treated little more than 1,000 people in about 4 weeks, the physicians of the county to a man engaged in the work treating with him during the same period 1,200 people.

(b) *Getting county appropriation.*—The physician in charge presents a petition to the county commissioners asking that they make an appropriation from county funds to defray all local expenses, as for drugs, for printing, for the services of a microscopist, for local travel, etc. This petition is backed by the county medical society, the county school board, and by influential citizens. This appropriation of county funds by the county commissioners carries with it a moral weight which no appropriation of money from the outside could have; it is an official announcement to every citizen that hookworm infection is prevalent in the county; that it is a serious menace to

the public welfare; that coöperation in this relief work is a public duty. In Mississippi, Alabama, and North Carolina, where the dispensaries got the earlier start, the work has gained such momentum that many counties now take the initiative in making the appropriation, then ask the State board of health to send a representative to take up the work.

(c) *Tour of inspection and education.*—The appropriation made or guaranteed, the field physician makes a tour of the county; he inspects the schools and lectures to them; he gives public lectures with stereopticon at important centers; he interests the newspapers and supplies them with copy and with cuts to illustrate it; he visits the mayors and other municipal officers and leading citizens in the towns, creating sentiment and organizing support for the work.

(d) *Opening dispensaries.*—The physician in charge selects usually about five points in the county for the dispensaries. These are centers to which the people may come for free examination and treatment for hookworm disease. For each dispensary he fixes a day in the week on which it will be open for about six successive weeks; he then floods the county with press notices, circular letters, and posters carrying this information to the people.

(e) *Treating the people and teaching them by demonstration.*—The physician visits each dispensary on the day set apart for it, and with the aid of a microscopist gives examination and treatment to all who come. Marked cases are treated on clinical diagnosis; the doubtful ones are examined microscopically. Those found infected are given the drug in dose form in an envelope on which are printed directions for taking the medicine and sanitary directions for the prevention

of reinfection. A record is made of each case (see dispensary form, Exhibit 17).

At the close of the work in the county the physician in charge makes to the county commissioners a report showing the expenditures, the work done, and the results accomplished. This report is published in the county, and is frequently given to the press of the State for its educational effect (see Exhibits 14, 15, and 16).

When the work began two years ago the State directors and I were strongly of the opinion that the people would not come to dispensaries for examination and treatment. At times the clinics are small when the dispensaries are new or in communities where the infection is light; but in communities where the infection is heavy and after the dispensary has had a few days within which to demonstrate its effectiveness, the people come in throngs; they come by boat, by train, by private conveyance for 20 and 30 miles. Our records contain stories of men, women, and children walking in over country roads 10 and 12 miles, the more anemic at times falling by the way, to be picked up and brought in by neighbors passing with wagons. As many as 455 people have been treated at one place in one day. Such a dispensary group will contain men, women, and children from town and country, representing all degrees of infection and all stations in life. A friend who had just visited some of the dispensaries said to me recently: "It looks like the days of Galilee."

The people usually begin to arrive early. I visited one dispensary at 8 o'clock in the morning and found 43 persons there waiting for attention. They linger; they gather in groups around the tables of exhibits; they listen to the stories of improvement as told by those who have been treated, and

return to their homes to report to their neighbors what they have seen and heard. The rapidity with which this teaching by demonstration gets its hold upon the people in communities where the infection is heavy is seen in the early records of the work in new territory. When the work opened in North Carolina in July, Dr. Covington treated in Halifax county the first week 194 people; the second week, 438; the third week, 537. In Robeson county Dr. Page treated the first week 40; the second week, 185; the third week, 478. In Sampson county Dr. Strosnider treated the first week 53; the second week, 316; the third week, 926. Four men in the first week of the work treated 615 cases; in the fourth week they treated 2,808.

Dispensaries are now in progress in North Carolina, South Carolina, Georgia, Alabama, Louisiana, Mississippi, and Tennessee. Some work has been done in Virginia, and three counties in that State have made the appropriation. In North Carolina 27 of the 100 counties have made the appropriation since July 1; in South Carolina 8 counties have made the appropriation; in Georgia, 2; in Alabama, 14; in Louisiana, 9; in Mississippi, 13; in Arkansas, 1; in Virginia, 5; in Tennessee, 5. In the 9 States 85 counties have appropriated \$10,799.60 for the work. The work has been organized in 66 counties, and 74,005 persons have thus been treated.

b. Results.—The effect of these educational activities is seen first of all in the transformation which has been wrought in public sentiment. This change of sentiment shows itself in the coöperation of the press—which is now practically universal in all the States—in the growing coöperation of the physicians, of the educational agencies, of the whole people; it shows itself in an increasing support, not only of this particular work, but of all public-health interests. Dr. Leathers, in

reporting for Mississippi, says: "The attitude of the public relative to public-health work is wholly different from what it was beginning with June 1, 1910; the State Medical Association has been awakened as never before in behalf of medical legislation. The incoming legislature unquestionably has a more intimate knowledge of the needs of the State along public-health lines than during any previous session of the State Legislature. * * * Public sentiment has been bettered to the extent of, I should say, 70 per cent." An expression of this growing sentiment is seen in the appropriations for the county dispensaries and in the records of examinations and of persons treated.

State.	Microscopic examinations.	
	1910.	1911.
Alabama	92	2,640
Arkansas	442	3,460
Georgia	1,165	7,816
Kentucky .....	....	834
Louisiana	79	5,975
Mississippi	1,682	14,757
North Carolina.....	7,949	37,328
South Carolina.....	85	3,052
Tennessee	545	7,876
Virginia	2,750	6,986
	<hr/>	<hr/>
	14,749*	90,724
Total number microscopically examined.....		105,473

* This number represents the microscopically positive for 1910. There were probably a few more examinations made but there is no definite record of other examinations.

State.	Persons treated.	
	1910.	1911.
Alabama .....	....	23,359
Arkansas	3,330	1,787
Georgia	1,400	8,200
Louisiana .....	....	9,429
Mississippi	824	35,099
North Carolina.....	8,000	45,881
South Carolina.....	665	5,020
Tennessee	204	2,735
Virginia .....	....	8,868
Total.....	14,423	140,378
Total persons treated to date....		155,301

3. **Educating the people in sanitation.**—All our work—even the treatment of the people—is educational; every person treated becomes the teacher of his neighbors; the final aim of all our effort is to teach the people to stamp out hook-worm infection by putting a stop to soil pollution. To this end three lines of activity are specifically directed:

(1) **The sanitary survey.**—The preliminary sanitary survey as conducted last year lacked uniformity and definiteness. In February of the present year the State directors in conference in Atlanta agreed upon a uniform plan for a definite sanitary survey of all the States. The survey is based on privy conditions and is to determine the degree of prevention of soil pollution. All privy types in use in these States were classified under the heads of "A," "B," "C," "D," "E," and "F" types; to each type was assigned its rating of efficiency on a scale of 100. The survey is made by counties; it is based on

an inspection of at least 100 rural homes; the number of homes inspected usually runs from 200 to 700 for the county; the inspector while on the ground records the privy conditions as of the A, B, C, D, E, or F type. When the inspection is completed the sanitary index for the county is estimated as follows:

..... County.		
1	at 75 per cent (Class B).....	75
2	" 25 per cent (Class D).....	50
165	" 10 per cent (Class E).....	1,650
58	" 0 per cent (Class F).....	00
<hr/>		<hr/>
226		)1,175
		<hr/>
		7 19/22
Sanitary index for the county.....		7 19/22

This means that the sanitary index for this county is in round numbers 8 on a scale of a possible 100.

The results of this survey as they come in are being tabulated and mapped by counties. It is giving us a body of definite information on soil pollution in rural districts. The work has been completed for 125 counties in nine States. A total of 43,448 rural homes have been inspected; of these 21,308 have no privies.

(2) Teaching the people the danger of soil pollution and how to stop it.—The infection survey is giving a pretty definite index to the degree of infection for each county; the sanitary index is giving definite information on the sanitary conditions responsible for the presence and spread of the disease; the work of the physicians and the county dispensaries is demonstrating what the presence of this infection means to

the individual and to the community; the organization in each state is driving these facts home to the people. Every activity outlined in detail in the report for last year has been kept up with increasing volume and definiteness; the people are being taught by public lectures illustrated with photographs, charts, and stereopticon; by bulletins and folders; by the public press; by exhibits at State and county fairs; by definite instruction in sanitation in the schools.

During the year the State organizations have delivered 3,620 public lectures; have reached in this way 451,877 people; have reached by personal visit 673 newspapers and furnished 1,843 articles to the press; have reached by personal visit 9,450 teachers, by bulletins 43,393, by letters 17,294, by lectures at institutes 15,448; they have distributed to the people 908,436 bulletins on sanitation.

(3) **Improving the county health service.**—The successful accomplishment of this task rests upon four permanent agencies: the State department of health, effectively organized and adequately equipped to give the work permanent organization and supervision; the practicing physicians of the State so enlisted in the service that they can be depended upon to treat all persons infected; the State system of public schools giving definite instruction in sanitation as a regular and permanent part of the school work; and, finally, *in each county a capable county superintendent of health devoting his whole time to public-health work.*

At present the county health officer in most counties in this country is a practicing physician; he is paid an insignificant sum to look after the public-health interests of the county, but must depend for the support of himself and his family on his private practice; it is not his fault that the service is in-

effective. The work is not going to be done until the man is paid an adequate salary for his services and is required to devote his whole time to the work.*

The last legislature of North Carolina enacted a law authorizing the counties to appoint a superintendent of health for his whole time, and providing that a superintendent of health appointed for his whole time shall, in addition to his other duties, make a sanitary inspection of all school plants, make medical examination of public-school children, and have microscopically examined all children suspected of having hookworm disease. This law became effective in February of this year. In June the county board of health of Guilford county, North Carolina, appointed a superintendent of health, appropriated \$2,500 from county funds for his salary and expenses, and stipulated that he should give his whole time to the work. This officer began work July 1; since that time he has inspected all the schools; has made a remarkable demonstration in the control of typhoid fever; is getting an accurate record of vital and mortuary statistics; is pushing disinfection of houses into the country and putting country springs, wells, and premises in sanitary condition; is preparing to make a complete sanitary survey of the county; is giving medical inspection to children in the rural schools; is conducting a continual campaign of education by means of stereopticon lectures; and is publishing a leaflet that goes to every farm home in the county.

Two counties in North Carolina now have superintendents of health giving their whole time to the work; the State reports increased efficiency in the health service of Columbus, Moore, Brunswick, Pender, Pitt, and a number of other counties; the North Carolina State Board of Health is deeply in-

* State Systems of Public Health in Twelve Southern States, p. 67.

terested in extending the service. Mississippi reports that at least 60 per cent of the county health officers of the State are more actively interested in public-health work. Definite sentiment has been created in Georgia in favor of a bill looking toward an efficient county health service. The bill enacted by the Arkansas legislature provided for a county health service.* The Kentucky State Department of Health, in taking up the work against hookworm disease, is undertaking to enlist the coöperation of county health officers in this work and to use it to create sentiment that will demand a superintendent of health for his full time.

Observation of the work in Guilford county convinces me that with an effective county superintendent of health devoting his whole time to the work in any county, there is no reason why hookworm disease should not within reasonable time be stamped out and kept out, as it has been eradicated in Switzerland and Hungary and is being kept out of these countries by the rigid observance of a few preventive measures.

* This bill was lost from the clerk's desk after its passage and did not reach the Governor.

CHAPTER II.

SUMMARY OF ACTIVITIES AND RESULTS BY STATES.

ALABAMA.

I. State survey by counties.

1. Infection survey,—based on an examination of at least 200 children between the ages of 6 and 18 years, taken at random from the country:

County.	Area.	Population.	No. examined.
Geneva	662	22,230	613
Dale	654	21,608	227

2. Sanitary survey,—based on an inspection of privy conditions at, at least, 100 country homes:

County.	Total No. inspected.
Coffee	414
Dale	337
Dallas	555
Escambia	205
Greene	421
Perry	308
Pike	267

II. Getting the people treated.

1. Enlisting the physicians:

	Total.
(1) Number of physicians in State.....	2,200
(2) Number of physicians personally visited.....	227
(3) Number of lectures to physicians.....	22
(4) Number of physicians reached.....	294
(5) Number of circular letters sent to physicians.....	1,200
(6) Number of physicians treating disease.....	227
(7) Number of persons treated by physicians.....	3,870

2. Getting the people to seek examination and treatment:

(1) Number of schools inspected.....	261
(2) Number of school children examined.....	6,527
(3) Number examined at dispensaries.....	27,404
(4) Number of persons examined:	
Clinically	33,931
Microscopically	2,640
Positive	1,355

- (5) Total number of persons examined..... 36,571
 (6) Number of persons treated by field force..... 19,489
 (7) Total number treated on record..... 23,359

3. Work of county dispensaries:

County.	Amount of appro.	Duration of campaign.
Butler	\$150.00	6 weeks
Choctaw	150.00	Not opened
Coffee	75.00	11 weeks
Conecuh	150.00	7 weeks
Covington	150.00	8 weeks
Dale	150.00	7 weeks
Dallas	250.00	8 weeks
Escambia	150.00	5 weeks
Geneva	150.00	11 weeks
Greene	150.00	3 weeks
Houston	60.00	7 weeks
Perry	150.00	5 weeks
Pike	150.00	5 weeks
Sumter	150.00	Not opened
Totals.....	\$2,035.00	83 weeks

County.	Number persons and times treated.			Total No. of people treated.	Total No. of treatments.
	One.	Two.	Three.		
Butler	2,744	150	....	2,744	2,894
Choctaw .....	....	....	....	....	....
Coffee	3,951	1,210	350	3,951	5,511
Conecuh	1,092	75	....	1,092	1,167
Covington	2,504	125	....	2,504	2,629
Dale	1,315	351	....	1,315	1,666
Dallas	667	86	....	667	753
Escambia	996	231	65	996	1,292
Geneva	1,459	82	....	1,459	1,541
Greene	140	42	....	140	182
Houston	576	20	....	576	596
Perry	928	188	....	928	1,116
Pike	3,117	932	336	3,117	4,385
Sumter .....	....	....	....	....	....
Totals...	19,489	3,492	751	19,489	23,732

4. Work of laboratory:

- (1) Number of specimens received and examined.... 335
 (2) Number of specimens positive, hookworm ova... 117
 (3) Percentage of infection thus shown..... 35

5. Summary:

- (1) Number of persons examined..... 36,571
 (2) Number of persons treated by physicians... 3,870
 (3) Number of persons treated by staff..... 19,489
 (4) Total persons treated..... 23,359

III. Educating the people in sanitation.

1. By public lectures:

(1) Number of public lectures delivered.....	161
(2) Estimated number of persons thus reached.....	15,000
(3) Total number of lectures delivered:	
Dr. Perry	165
Dr. Orr	230
Dr. Perdue	137

 532

2. Through the schools:

(1) Number of teachers in State.....	6,434
(2) Number of teachers reached by visit.....	361
(3) Number of teachers reached by letter.....	380
(4) Number of teachers reached by bulletins.....	410
(5) Number of teachers reached by institutes.....	100
(6) Total number of teachers reached:	
Dr. Perry	377
Dr. Orr	407
Dr. Perdue	366

 1,150

3. By bulletins, leaflets and special literature:

(1) Total number bulletins distributed:	
Dr. Perry	24,000
Dr. Orr	30,000
Dr. Perdue	17,000

 71,000

4. By the public press:

(1) Number of papers in State.....	258
(2) Number of papers personally visited.....	19
(3) Number of articles furnished for publication....	49

 Total.

IV. Notes on the work of the year.

1. Dothan city administration and the county board of health have been brought into a closer relationship, resulting in a more efficient and vigorous sanitary campaign. The salary of the city health officer for Dothan was raised from \$200 to \$400 per year. The city of Columbia raised by popular subscription \$6,000 for the purpose of installing a modern sewer system. The town of Ozark floated bonds for a sanitary system. The city of Enterprise adopted regulations restricting the use of surface privies and providing means for handling them. A plan for a sewage system for the city has been made and the question of installing it is to be submitted to popular

vote. The sewer area of the city of Troy is being extended. Sanitary regulations for the whole city are being more rigidly enforced.

2. The school authorities of Dale county adopted regulations requiring sanitary privies to be built at all schools and enforcing strict sanitary regulations. The community of Farmers' Academy, Coffee county, has made arrangements for installing sanitary privies at the school and in most of the homes. Sanitary privies are now being built in the public schools in Pike county.

3. The county health officers in Perry county and Greene county agreed to personally conduct a free clinic at their respective offices on Saturday of each week to treat, for hookworm disease, all persons who would apply. The field man in each case advertised this fact over the entire county by means of circular literature and the county press. The two health officers supplemented this by mailing post cards stating their intention to continue the dispensary and urging the people to come for examination and treatment. The central office has given every possible aid to this movement in an effort to make it a success.

4. The one important result thus far achieved is one quite difficult to tabulate or to express in tangible terms, namely, the fact that there has been created a strong and active sentiment among all sorts and conditions of men, women, and children as to the importance of hookworm eradication. This is a force that is working slowly but surely, and which must lead ultimately to a proper enforcement of regulations and certain legislation on sanitation. Legislation must follow in the wake of the educational campaign, which is creating a sentiment looking to that end.

ARKANSAS.

I. State survey by counties.

1. Infection survey,—based on an examination of at least 200 children between the ages of 6 and 18 years, taken at random from the country:

County.	Area in square miles.	Population.	Number examined.
Bradley	658	9,651	260
Calhoun	646	8,539	210
Columbia	846	22,077	620
Cleveland	581	11,620	215
Dallas	657	11,518	260
Grant	640	7,671	250
Hot Spring	631	12,748	220
Ouachita	742	20,802	300
Union	1,074	22,495	350

2. Sanitary survey,—based on an inspection of privy conditions at, at least, 100 country homes:

County.	Total number inspected.
Ashley	878
Bradley	670
Calhoun	286
Clark	740
Cleveland	468
Columbia	593
Dallas	440
Drew	570
Grant	740
Hot Spring	404
Nevada	370

II. Getting the people treated.

1. Enlisting the physicians:

(1) Number of physicians in State.....	3,600
(2) Number of physicians personally interested.....	675
(3) Number of lectures to physicians.....	49
(4) Number of physicians thus reached.....	750
(5) Number of circulars and letters sent to physicians.....	7,500
(6) Number of bulletins sent to physicians.....	5,000
(7) Number of physicians now treating the disease....	200
(8) Number of persons treated by physicians.....	1,500

2. Getting the people to seek examination and treatment:

(1) Number of schools inspected.....	222
(2) Number of families inspected.....	7,800
(3) Number of persons examined clinically.....	4,000

3b

(4) Number of persons examined microscopically.....	3,460
Positive	1,879
(5) Total number of persons examined.....	7,460
(6) Number of persons treated by field force.....	287
(7) Total number of persons treated on record.....	1,787

3. Work of county dispensaries:

County.	Amt. of appro.	Duration of campaign.	Expenditures.
Columbia.....	\$50.00	8 weeks	\$50.00

County.	No. persons and times treated.				Total No. people treated.	Total No. treat- ments.
	One.	Two.	Three.	Four.		
Columbia	287	185	55	10	287	537

4. Report of laboratory:

(1) Total number of specimens examined.....	1,601
(2) Number containing hookworm ova.....	
(3) Number containing other parasites.....	
(4) Average per cent of infection.....	72
(5) Number of mailing cases distributed.....	2,000
(6) Number of mailing cases returned.....	1,400

5. Summary:

(1) Number of persons examined.....	7,460
(2) Number of persons treated by physicians... 1,500	
(3) Number of persons treated by staff.....	287
(4) Total persons treated.....	1,787

III. Educating the people in sanitation.

1. By public lectures:

(1) Number of public lectures delivered.....	337
(2) Estimated number of persons reached.....	50,550

2. Through the schools:

(1) Number of teachers in State.....	9,522
(2) Number of teachers reached by visit.....	805
(3) Number of teachers reached by letter.....	5,400
(4) Number of teachers reached by bulletin.....	5,400
(5) Number of teachers reached at institutes.....	1,600

3. By bulletins, leaflets, and special literature:

(1) Total number of leaflets and bulletins distributed..	61,324
--	--------

4. Through the press:

(1) Number of papers in State.....	310
(2) Number of papers personally visited.....	35
(3) Number of letters to press.....	360
(4) Number of articles furnished for publication.....	110

IV. Notes on the work of the year.

1. There is a growing coöperation on the part of the press, the school teachers, the ministers, and the people. Many county papers have begun the publication of notes or articles dealing with health matters. Many of the ministers are preaching health sermons. The people are beginning to demand the passage of sanitary laws.

2. The recent legislature enacted a public-health law which gave to the Commissioner of Health all necessary power to make and enforce sanitary rules and regulations. The bill contained a special section which referred to rural sanitation and which was far-reaching in its aims. By some means the bill was lost before reaching the Governor for his signature; it therefore failed to become a law. The people of the State, having seen the work which has been done by the Rockefeller Commission, are in favor of a public-health department, and it is confidently expected that the ill-fated bill will be enacted at the next meeting of the legislature.

3. The State Teachers' Association, at its annual meeting December 28 to 30, took official action, organizing in each county a county school bureau of health. The purpose of this bureau is to enlist the coöperation of the entire teaching profession in an organized movement to improve sanitary conditions at the schools and at the homes throughout the State. This action brings to the work the coöperation of 9,000 teachers for the year 1912.

GEORGIA.

I. State survey by counties.

1. Infection survey, based on an examination of at least 200 children between the ages of 6 and 18 years, taken at random from the country:

County.	Area in sq. miles.	Population.	Number examined.
Lowndes	455	20,036	219
Tift .....	.....	.....	349

2. Sanitary survey, based on an inspection of privy conditions at, at least, 100 country homes:

County.	Total No. inspected.
Clarke	726
Berrien	370
Gwinnett	226
Hall	398
Jackson	208
Madison	686
Oconee	565
Tift	299
Turner	425
Walton	350
Washington	728

II. Getting the people treated.

1. Enlisting the physicians:

(1) Number of physicians in State.....	2,887
(2) Number of physicians personally interested...	613
(3) Number of lectures to physicians.....	11
(4) Number of physicians thus reached.....	429
(5) Number of letters and circulars sent to physicians	2,887
(6) Number of bulletins sent to physicians.....	2,887
(7) Number of physicians now treating the disease	690
(8) Number of persons treated by physicians....	7,228

2. Getting the people to seek examination and treatment:

(1) Number of schools inspected	454
(2) Number of persons examined clinically.....	28,932
(3) Number of persons examined microscopically.	7,816
(4) Total number of persons examined.....	36,748
(5) Number of persons treated by field force.....	972
(6) Total number of persons treated on record....	8,200

3. Work of county dispensaries:

County.	Amt. of appro.	Duration of campaign.
Lowndes	\$150.00	6 weeks
Tift	150.00	6 weeks
Totals.....	\$300.00	12 weeks

County.	No. persons and times treated.					Total No. of people treated.	Total No. of treat- ments.
	One.	Two.	Three.	Four.	Five.		
Lowndes	385	78	9	4	1	385	477
Tift	587	33	3	..	..	587	623
Totals	972	111	12	4	1	972	1,100

4. Work of laboratory:

(1) Number of examinations positive.....	1,877
(2) Number of examinations negative.....	2,423
(3) Total number of examinations.....	4,300
(4) Number of specimens of hookworm.....	1,877
(5) Number of specimens of <i>Tænia</i>	57
(6) Number of specimens of <i>Tricocephalus</i> Dispar... ..	2
(7) Number of specimens of <i>Ascaris lumbricoides</i> ...	39
(8) Number of specimens of <i>Oxyuris vermicularis</i> ...	5
(9) Total number intestinal parasites.....	1,980

5. Summary:

(1) Number of persons examined.....	36,748
(2) Number of persons treated by physicians. 7,228	
(3) Number of persons treated by staff.....	972
(4) Total number of persons treated.....	8,200

III. Educating the people in sanitation.

1. By public lectures:

(1) Number of public lectures delivered.....	631
(2) Estimated number of persons thus reached.....	50,772

2. Through the schools:

(1) Number of teachers in State.....	8,714
(2) Number of teachers reached by visit.....	845
(3) Number of teachers reached by bulletin.....	7,500
(4) Number of teachers reached at institutes.....	850

3. By bulletins, leaflets, and special literature:

(1) Number of bulletins, leaflets, etc.....	39,275
(2) Health talks by State Director and sent to teachers by Superintendent of Education.....	1,500
(3) Typewritten plans of sanitary surface privy.....	173

(4) Plans of surface privy sent from Dept. of Education.....	1,500
(5) Two letters to Congressmen urging distribution of Department of Agriculture Bulletin 463.....	22
(6) Literature distributed by field men.....	25,417
(7) Literature distributed by central office.....	43,502
(8) Total literature distributed.....	68,919
4. Through the public press:	
(1) Number of papers in State.....	375
(2) Number of papers personally visited.....	81
(3) Number of letters to press.....	295
(4) Number of articles furnished for publication.....	655
(5) Number of articles printed for field men.....	101

IV. Notes on the work of the year.

1. The State Board of Health has granted permission to the Department of Field Sanitation to undertake dispensary work, provided the consent of every practicing physician in counties where the work is to be done is first secured.

2. There are no county boards of health in Georgia.

3. The County Board of Education in Bartow has issued regulations requiring sanitary privies at all the schools in the county. The Lowndes County Board of Education is urging the installation of sanitary privies in the rural schools of the county.

4. The press is more active in its campaign for better health and sanitary conditions than ever before; the relationship between the Department of Health and the Department of Education is closer than ever before. There is a growing coöperation on the part of the people.

5. For the Department of Education we have prepared plans and specifications for sanitary privies at public schools and a bulletin on health talks for use in the public schools.

6. The Governor issued a proclamation calling for a Health Day, with proper ceremonies, at the public schools.

7. Our work helped to secure medical inspection of school children in Fulton county and Decatur.

LOUISIANA.

I. State survey by counties.

1. Infection survey,—based on an examination of at least 200 children between the ages of 6 and 18 years, taken at random from the country:

Parish.	Area in square miles.	Population.	Number examined.
Acadia.....	633	23,483	283
Bienville.....	832	17,588	548
Caddo.....	906	44,499	205
Lafayette.....	259	22,825	267
Lincoln.....	465	15,898	558
St. Martin.....	493	18,940	352
St. Tammany.....	874	13,335	304
Union.....	888	18,530	221
Vermilion.....	1246	20,705	398
Washington.....	638	9,628	502

2. Sanitary survey,—based on an inspection of privy conditions, at, at least, 100 country homes:

Parish.	Total No. inspected.
Acadia	1,349
Bienville	662
Caddo	205
Lafayette	726
Lincoln	467
St. Martin	851
St. Tammany	387
Union	475
Vermilion	817
Washington	546

II. Getting the people treated.

1. Enlisting the physicians:

(1) Number of physicians in State.....	2,033
(2) Number of physicians personally interested.....	791
(3) Number of lectures to physicians.....	12
(4) Number of physicians thus reached.....	696
(5) Number of circulars and letters sent to physicians.....	6,500
(6) Number of bulletins sent to physicians.....	4,627
(7) Number of physicians now treating disease.....	159
(8) Number of persons treated by physicians.....	1,197

2. Getting the people to seek examination and treatment:

(1) Number of schools inspected.....	431
(2) Number of persons examined clinically.....	28,978
(3) Number of persons examined microscopically....	5,975
(4) Total number of persons examined.....	34,953
(5) Number of persons treated by field force.....	8,232
(6) Total number of persons treated on record.....	9,429

3. Work of county dispensaries:

Parish.	Amt. of appro.	Duration of campaign.	Expendi- tures.
Bienville	\$100.00	6 weeks	\$100.00
Caddo	150.00	Running.	
Jackson	150.00	Not begun.	
Lincoln	100.00	6 weeks	127.50*
Morehouse	200.00	Not begun.	
Rapides	100.00	Not begun.	
St. Tammany.....	150.00	6 weeks	75.00
Union	100.00	Running.	
Washington	100.00	6 weeks	100.00
Totals	\$1,150.00	24 weeks	\$402.50

Parish.	Number of persons and times treated.						Total No. people treated.	Total No. of treatments.
	One.	Two.	Three.	Four.	Five.	Six.		
Bienville	1183	185	68	54	..	..	1183	1490
Caddo .....	..	..	..	..	..	..	..	..
Jackson .....	..	..	..	..	..	..	..	..
Lincoln	1481	215	52	29	1	1	1481	1779
Morehouse .....	..	..	..	..	..	..	..	..
Rapides .....	..	..	..	..	..	..	..	..
St. Tammany....	715	261	60	11	..	..	715	1047
Union .....	..	..	..	..	..	..	..	..
Washington'.....	1622	741	341	27	2	..	1622	2733
Totals	5001	1402	521	121	3	1	5001	7049

4. Work of laboratory:

	Number of examinations.	Positive.	Negative.	Per cent.
Train	229	104	125	45.4
Field men	4532	1705	2827	37.6
Central office ...	1021	128	893	12.5
	5782	1937	3845	

5. Summary:

(1) Number of persons examined.....	23,598
(2) Number of persons treated by physicians	1,197
(3) Number of persons treated by staff.....	8,232
(4) Total number of persons treated.....	9,429

III. Educating the people in sanitation.

1. By public lectures:

(1) Number of public lectures delivered.....	466
(2) Estimated number of persons thus reached.....	97,237

*School Board will pay balance of \$27.50.

2. Through the schools:

(1) Number of teachers in State.....	4,981
(2) Number of teachers reached by visit	1,760
(3) Number of teachers reached by letter	2,378
(4) Number of teachers reached by bulletins	4,000
(5) Number of teachers reached by institutes	2,277

3. By bulletins, leaflets and special literature:

(1) Total number distributed.....	62,027
-----------------------------------	--------

4. Through the public press:

(1) Number of papers in state.....	219
(2) Number of papers personally visited	104
(3) Number of letters to press.....	1,200
(4) Number of articles furnished for publication.....	150

IV. Notes on the work of the year.

1. Regulations were adopted by State Board of Health requiring Stiles' sanitary privy as a minimum. The Secretary has notified all superintendents of the various parishes that the law concerning closets at the schools must be complied with. The State Board of Education is backing the regulation of the State Board of Health. Superintendent Harris has requested reports on school closets from parish superintendents and is backing the regulation of the State Board of Health.

2. Haynesville has a law requiring the installation of sanitary closets in all homes. The authorities established a closet license of 40 cents per month, the town assuming the task of remodeling all closets to conform to the law. Janesville and Pearl River have adopted laws requiring sanitary closets. The citizens of Opelusas voted a tax for sewage system.

3. Lincoln parish adopted resolutions endorsing the sanitary work now going on in the State for the eradication of hookworm disease and pledged themselves to the improvement of sanitary conditions at the public schools. St. Tammany, La-

fayette, Tangipahoa, and St. Martin adopted regulations requiring sanitary closets in all schools. Estimated number of sanitary privies built, 1,500.

4. The health officer of St. Tammany parish has agreed to continue the free treatment of patients after the regular campaign closes, doing this work on Saturdays. The parish made an appropriation of \$75 to continue the free treatment for hookworm disease. The health officer of Washington parish has also agreed to continue the free treatment of patients for hookworm disease.

5. The Louisiana State Medical Society at its annual meeting in Shreveport adopted resolutions approving the work of the campaign to eradicate hookworm disease; the Society pledged itself to coöperate and urged upon the police juries of the different parishes and the medical profession in Louisiana the necessity of community action; it recommended that appropriations be made for the dispensary work.

MISSISSIPPI.

I. State survey by counties.

1. Infection survey, based on an examination of at least 200 children between the ages of 6 and 18 years, taken at random from the country:

County.	Area in square miles.	Population.	Number examined.
Alcorn.....	402	14,987	208
Clarke.....	664	17,741	215
Covington.....	577	13,076	508
George.....	...	.....	902
Harrison.....	982	21,002	219
Itawamba.....	526	13,544	347
Jeff Davis.....	...	.....	283
Jones.....	674	17,846	1,108
Lafayette.....	673	22,110	199
Lincoln.....	574	21,552	1,333
Marion.....	1,095	23,501	1,472
Newton.....	561	19,708	541
Pearl River.....	663	6,697	395
Rankin.....	774	20,955	435
Scott.....	584	14,316	542
Simpson.....	578	12,800	482
Tishomingo.....	433	10,124	372

2. Sanitary survey, based on an inspection of privy conditions at at least 100 country homes.

County.	Total number inspected.
Alcorn	514
Itawamba	351
Jones	139
Lamar	140
Leake	250
Marion	300
Pearl River	234
Smith	239
Tishomingo	261

II. Getting the people treated.

1. Enlisting the physicians:

(1) Number of physicians in State.....	1,783
(2) Number of physicians personally visited.....	1,350
(3) Number of lectures to physicians.....	16
(4) Number of physicians thus reached.....	831
(5) Number of circular letters sent to physicians.....	5,835
(6) Number of bulletins sent to physicians.....	21,336
(7) Number of physicians treating the disease.....	786
(8) Number of persons treated by physicians.....	15,803

2. Getting the people to seek examination and treatment:

(1) Number of schools inspected	571
(2) Number of persons examined clinically..	21,194
(3) Number of persons examined microscopically.....	14,757
(4) Total number of persons examined.....	35,951
(5) Number of persons treated by field force	19,296

3. Work of county dispensaries:

County.	Amt. of Co. app.	Duration of campaign.
George	150.00	Running
Harrison	150.00	6 wks. 4 das.
Jackson	150.00	Running
Jones	158.10	9 weeks
Lamar	150.00	6 weeks
Lincoln	200.00	Running
Leake	225.00	5 weeks
Marion	181.50	5 months
Neshoba	150.00	5 weeks
Pearl River	150.00	4 wks. 3 das.
Scott	100.00	3 weeks
Tishomingo	150.00	5 weeks
Winston	200.00	Running
Totals.....	\$2,114.60	64 weeks.

County.	Number of persons and times treated.						Total No. people treated.	Total No. of treatments.
	One.	Two.	Three.	Four.	Five.	Six.		
George	997	869	653	278	5	0	997	2802
Harrison	2621	1973	1464	820	64	6	2621	6948
Jackson .....	.....	.....	.....	.....	..	..	.....	.....
Jones	2532	1462	896	103	2	0	2532	4995
Lamar	1583	931	456	29	4	0	1583	3003
Lincoln	671	173	64	0	0	0	671	908
Leake	610	180	14	4	0	0	610	808
Marion	1078	462	168	29	5	0	1078	1742
Neshoba	1883	706	268	51	15	0	1883	2923
Pearl River.....	2480	1403	892	55	9	0	2480	4839
Scott	162	33	1	0	0	0	162	196
Tishomingo	771	197	22	1	0	0	771	991
Winston .....	.....	.....	.....	.....	.....	.....	.....	.....
Totals ...	15388	8389	4898	1370	104	6	15388	30155

4. Work of laboratory:

(1) Total number of examinations.....	1600
(2) Number of examinations positive hookworm.....	500
(3) Number of examinations negative hookworm.....	1100
(4) Parasites found:	
Necator Americanus	493
Hymenolepis nana	20
Ascaris lumbricoides	8

Agchylostoma duodenale	7
Strongyloides intestinalis	5
Oxyuris vermicularis	2
Circomonas intestinalis	2
Balantidium coli	1
Taenia saginata	1
Total	539

5. Summary:

(1) Number of persons examined by State organization.	35,951
(2) Number of persons treated by physicians....	15,803
(3) Number of persons treated by staff.....	19,296
(4) Total number of persons treated.....	35,009

III. Educating the people in sanitation.

1. By public lectures:

(1) Number of public lectures delivered.....	302
(2) Estimated number of persons thus reached.....	51,640

2. Through the schools:

(1) Number of teachers in State.....	5,440
(2) Number of teachers reached by visit	1,500
(3) Number of teachers reached by letter	1,226
(4) Number of teachers reached by bulletins	5,440
(5) Number of teachers reached at institutes.....	3,760

3. By bulletins, leaflets and special literature:

(1) Total number distributed.....	246,000
-----------------------------------	---------

4. Through the public press:

(1) Number of papers in State.....	258
(2) Number of papers personally visited.....	130
(3) Number of letters to press.....	150
(4) Number of articles furnished for publication.....	310

IV. Notes on the work of the year.

1. The attitude of the public relative to public-health work is wholly different from what it was beginning with June 1, 1910. The State Medical Association has been awakened as never before in behalf of medical legislation. The incoming legislature unquestionably has a more intimate knowledge of the needs of the State along public-health lines than during any previous session of the State legislature. The legislature

convenes at noon on Tuesday, January 2, 1912. Five bills will be presented to the legislature for consideration, namely, "A bill amending the Medical Practice Act requiring a high-school training for the study of medicine and the M. D. degree from a reputable medical college before being admitted to the licensing examination for the practice of medicine"; "A bill requiring the reporting of births and deaths of the entire State"; "A bill making it possible for the building of sanitary closets at every school-house in the State"; "A bill legalizing the inspection of hotels, trains, railway cars, depots, and public buildings."

2. By a regulation of the State Board of Health the public drinking cup has been abolished during the past year on all trains of the State. This regulation is also applied to schools and public buildings.

3. The record relative to the building of sanitary closets as near as can be determined is five hundred.

4. Many towns and cities have passed regulations resulting from the campaign during the past year. Amory, Miss., voted the issuance of bonds to the amount of \$60,000 for sewerage, largely the result of this work. Laurel, Miss., has passed an ordinance requiring sanitary closets and the safe disposal of waste. Lexington, Miss., has also passed such an ordinance.

5. I think it is perfectly conservative to state that 60 per cent of the county health officers of the State are more actively interested in public-health work.

6. Public sentiment has been bettered to the extent of, I should say, 70 per cent.

7. The public-health work during the past year has progressed along all lines in a very satisfactory manner. There

has been a general awakening on the part of the people throughout the State in regard to better sanitary conditions about the home, around the school, and in all community life. Public sentiment has been aroused in behalf of the campaign for improved sanitary conditions. However, the problem of eradicating any disease is an enormous task, but with a continuously aggressive and determined effort on the part of public-health officials within a relatively short time Mississippi, as well as the entire South, can be revolutionized in the protection of human life by preventing not only hookworm disease, but also the other common preventable diseases.

8. In my opinion the Rockefeller Sanitary Commission has been instrumental in creating a movement throughout the South which will ultimately have its effect upon the entire country. It is undoubtedly a monumental undertaking and will result in untold and incalculable good to the South and to the entire country.

NORTH CAROLINA.

I. State survey by counties.

1. Infection survey, based on an examination of at least 200 children between the ages of 6 and 18 years, taken at random from the country:

County.	Area in sq. miles.	Population.	Number examined.
Burke,	400	21,408	426
Caldwell,	450	20,579	337
Columbus,	750	28,020	263
Cumberland,	900	35,284	1537
Davie,	500	13,394	225
Duplin,	670	25,442	257
Hertford,	340	15,436	389
Johnston,	740	41,401	394
McDowell,	440	13,538	287
Mitchell,	240	17,245	210
Montgomery,	570	14,967	248
Pender,	800	15,471	612
Pitt,	820	36,340	412
Randolph,	900	29,491	254
Robeson,	950	51,945	1,411
Rowan,	461	37,521	246
Sampson,	921	29,982	859
Wake,	777	63,229	200
Warren,	450	20,266	399
Wayne,	600	35,698	1,943
Yancey,	400	12,072	557

2. Sanitary survey, based on an inspection of privy conditions at at least 100 country homes:

County.	Total No. inspected.
Bladen,	141
Brunswick,	336
Buncombe,	249
Burke,	365
Caldwell,	670
Catawba,	198
Chatham,	103
Cleveland,	359
Columbus,	785
Cumberland,	294
Davidson,	143
Davie,	111
Duplin,	338
Edgecombe,	175
Forsyth,	157
Gaston,	118
Greene,	240
Guilford,	208
Halifax,	721
Harnett,	119
Hertford,	183

Iredell,	265
Johnston,	249
Jones,	206
Lenoir,	312
Lincoln,	269
McDowell,	456
Mitchell,	597
Montgomery,	329
Northampton,	357
Onslow,	473
Pender,	219
Pitt,	260
Randolph,	283
Robeson,	477
Rowan,	350
Rutherford,	379
Sampson,	179
Stanly	107
Wake,	133
Warren,	444
Wayne,	211
Wilson,	187
Yancey,	433

II. Getting the people treated.

i. Enlisting the physicians:	Total.
(1) Number of physicians in State.....	1,879
(2) Number of physicians personally visited....	676
(3) Number of lectures to physicians.....	11
(4) Number of physicians thus reached.....	300
(5) Number of circular letters sent to physicians.	7,061
(6) Number of bulletins sent to physicians.....	3,130
(7) Number of prescription pads.....	4,000

(8) Number of physicians treating disease:	
Number reporting 1910.....	838
Number of additional reporting 1911..	357

Total number reporting..... 1,195

(9) Number of persons treated by physicians:	
1910.....	8,000
1911.....	16,709

Total number of persons treated by physicians 24,709

2. Getting the people to seek examination and treatment:	Total
(1) Number of schools inspected.....	470
(2) Number of persons examined:	
Clinically	47,289
Microscopically	37,328
(3) Total number of persons examined.....	84,617
(4) Number of persons treated by field force....	29,172

3. Work of county dispensaries :

Doctor and county. (Dr. Page)	Amt. of Co. app. campaign.	Duration of campaign.	Expenditures.		Microscopic.		Clinical.		Total examina- tions.
			+	—	+	—	+	—	
Robeson	\$300	6 weeks	\$274.00		675	690	1,298	600	3,263
Cumberland	300	6 weeks	208.72		775	762	1,064	700	3,301
Bladen	200	5 weeks	138.20		131	126	1,352	1,696	3,395
Harnett	200	6 weeks	180.10		302	401	1,200	1,514	3,477
Totals.....	\$1,000	23 weeks	\$801.02		1,943	1,979	4,914	4,510	13,346
(Strosnider)									
Sampson	\$300	6 weeks	\$266.29		1,483	737	951	436	3,607
Wayne	300	6 weeks	221.55		822	496	159	177	1,654
Pitt	300	9 weeks	302.08		1,960	1,951	430	185	4,526
Totals.....	\$900	21 weeks	\$789.92		4,265	3,184	1,540	798	9,787
Expenditures.									
Microscopic examinations.									
Clinical examinations.									
Total									
Doctor and county. (Pridgen)	Amt. of co. app.	Duration of campaign.	Expenditures.		Microscopic examinations.		Clinical examinations.		Total
			+	—	+	—	+	—	
Columbus	\$300	6 weeks	\$328.89		213	12	3,719	2,319	6,263
Onslow	200	5 weeks	155.68		43	67	3,690	3,583	7,383
Pender	200	6 weeks	176.94		347	162	2,078	2,141	4,728
New Hanover	300	6 weeks	133.45		227	144	309	440	1,120
Totals.....	\$1,000	23 weeks	794.96		830	385	9,796	8,483	19,494

Doctor and county.	Number receiving treatment.				Total No. people treated.	Total No. treatments.
	One.	Two.	Three.	Four.		
(Page)						
Robeson	1,973	....*	....*	....*	1,973	3,091
Cumberland ..	1,839	477	89	24	1,839	2,429
Bladen	1,483	339	119	5	1,483	1,946
Harnett	981	311	100	19	981	1,411
Total.....	6,276	1,127	308	48	6,276	8,877
(Strosnider)						
Sampson	2,347	589	192	....	2,347	3,128
Wayne	824	246	166	8	824	1,244
Pitt	2,333	680	476	23	2,333	3,512
Total.....	5,504	1,515	834	31	5,504	7,884
(Pridgen)						
Columbus	3,920	11	1	....	3,920	3,932
Onslow	3,164	547	21	1	3,164	3,733
Pender	1,719	646	57	3	1,719	2,425
New Hanover .	419	108	9	....	419	536
Total.....	9,222	1,312	88	4	9,222	10,626
(Covington)						
Halifax	2,179†	460†	222†	118†	2,179†	2,979
Northampton .	2,197†	261†	160†	80†	2,197†	2,698
Warren	862	331	212	180	862	1,585
Hertford	1,262	380	178	61	1,262	1,881
Total.....	6,500	1,432	772	439	6,500	9,143
(Hughes)						
Brunswick ...	1,670	865	416	126	Five. 22 1,670	3,099

* No record and no estimate.

† Estimated.

Summary.

	Number receiving treatment.					Total No. people treated.	Total No. treatment.
	One.	Two.	Three.	Four.	Five.		
Page	1,127	307	48	...	6,276	8,877
Strosnider	1,515	834	31	...	5,504	7,884
Pridgen	1,312	88	4	...	9,222	10,626
Covington	1,432	772	439	...	6,500	9,143
Hughes	865	416	126	22	1,670	3,099
Total.....	...	6,251	2,418	648	22	29,172	39,629

Additional counties making appropriations for county dispensaries: Craven, Carteret, Beaufort, Edgecombe, Bertie, Wake, Person, Vance, Gates, Johnston.

4. Work of laboratory for 1911:

Quarter ending:					Total.
	March 31.	June 30.	Sept. 30.	Dec. 31.	
Number of specimens examined.....	9,045	6,906	2,300	1,864	20,115
Number of specimens negative.....	5,391	4,909	1,624	1,408	13,332
Number of specimens ascaris ova.....	3,226	1,600	599	336	5,761
Number of specimens ascaris ova.....	676	280	58	64	1,078
Number of specimens hymenolepis ova.....	137	225	16	31	409
Number of specimens trichocephalus.....	66	25	7	28	126
Number of specimens strongyloides.....	11	40	14	8	79
Number of specimens oxyuris.....	6	6	2	3	17
Number of specimens T. Saginta.....	1	0	1	0	2
Number showing some form of infection.....	3,654	1,997	676	456	6,783

5. Summary:

(1) Number of persons examined.....	64,502
(2) Number of persons treated by physicians.....	16,709
(3) Number of persons treated by staff.....	29,172
(4) Total number of persons treated.....	45,881

III. Educating the people in sanitation

1. By public lectures:	Total
(1) Number of public lectures delivered.....	483
(2) Estimated number of persons thus reached.....	39,579

2. Through the schools:	
(1) Number of teachers in State.....	8,422
(2) Number of teachers reached by visit.....	982
(3) Number of teachers reached by letter.....	5,115
(4) Number of teachers reached by bulletins.....	8,387
(5) Number of teachers reached by institutes.....	2,261

3. By bulletins, leaflets, and special literature:	
(1) Number of bulletins distributed.....	36,500
(2) Number of leaflets distributed.....	90,000
(3) Number of hookworm pamphlets distributed.....	100,000
(4) Number of sanitary privy pamphlets distributed...	80,500

4. Through the public press:	Total.
(1) Number of papers in State.....	306
(2) Number of papers personally visited.....	191
(3) Number of letters to press.....	3,345
(4) Number of articles furnished for publication.....	300
(5) Other literature or letters:	
Letters to Superintendents of schools.....	217
Letters to County Commissioners.....	400
Letters to Women's Club members... ..	59
Letters to Legislators.....	100
	776

* Dispensary lectures not counted.

IV. Notes on the work of the year.

1. As a result of the campaign activities against hookworm disease the State Legislature, in increasing the health appropriation of the State, provided \$5,000 to be used supplementary to the funds of the Rockefeller Sanitary Commission.

2. In revising the State health laws it was stipulated that where county superintendents of health are employed for their

entire time there shall be medical examination of all public-school children of the county. This examination includes the common physical defects and hookworm disease.

3. A number of municipal boards have passed ordinances requiring the installation and use of sanitary privies. Among the towns having taken such action are Rocky Mount, Lumberton, Jacksonville, Richlands.

4. The county superintendents of schools and the county boards of education have been found interested and responsive. They have been ready to do what their funds and the law will permit toward improving conditions. The county boards of education in a number of counties stand ready to pay a health officer to work among public-school children. County boards of commissioners have provided liberally for the county dispensaries and are extending the duties of county superintendents of health.

5. Guilford county has employed a county superintendent of health for his entire time. Columbus has a county superintendent of health on salary and requires that he treat hookworm disease and visit schools. Moore county has a superintendent of health for one-half his time. He has been visiting schools and has treated a large number of cases of hookworm disease. The Brunswick county superintendent of health has, in company with the county superintendent of schools, visited all the schools of the county and lectured on sanitation, flies, and hookworm disease. The superintendents of health in Pender, Pitt, and a number of other counties are devoting more time to health work.

6. County boards of education in Halifax, Durham, Wayne, Mecklenberg, Columbus, Wake, and a few others, have ordered the building of sanitary privies at the school-houses in these

counties and have begun the work. One hundred privies have already been built at the public school-houses in Rowan county.

7. The campaign work has exercised a wonderful influence on the people generally by awakening them to a realization that our health conditions are far from satisfactory; that little attention is paid to sanitation, and that to this neglect is attributable in large measure our unnecessary sickness, our physical and mental lassitude, our thriftlessness and poverty. Though the work of improving sanitation will move slowly, progress is already noticeable and is gaining momentum.

SOUTH CAROLINA.

I. State survey by counties.

1. Infection survey, based on an examination of at least 200 children between the ages of 6 and 18 years, taken at random from the country:

County.	Area in sq. miles.	Population.	Number examined.
Marion	993	35,181	259
Clarendon	710	28,184	189
Hampton	936	23,738	740

2. Sanitary survey, based on an inspection of privy conditions at at least 100 country homes:

County.	Total No. inspected.
Marion	795
Clarendon	220
Hampton	232
Beaufort	1,046

II. Getting the people treated.

1. Enlisting the physicians:

Number of physicians in State.....	1,113
Number of physicians personally interested... ..	228
Number of lectures to physicians.....	8
Number of physicians thus reached.....	350
Number of letters and circulars sent to physicians	2,226
Number of bulletins sent to physicians.....	4,000
Number of physicians now treating the disease..	100

2. Getting the people to seek examination and treatment:

Number of schools inspected.....	368
Number of persons examined clinically.....	7,940
Number of persons examined microscopically....	3,052
Number of specimens positive.....	1,603
Total number of persons examined.....	10,992
Number of persons treated by field force.....	3,246
Number of persons treated by physicians.....	1,774
Total number of persons treated on record.....	5,020
Estimated number treated, not reported.....	5,000

3. Work of county dispensaries:

County.	No. of persons and times treated.						Total No. people treated.	Total No. treat- ments.
	One.	Two.	Three.	Four.	Five.	(?)		
Hampton	743	468	150	12	3	...	743	1,377
Marion	931	110	48	..	..	...	931	1,038
Clarendon ...	552	54	..	..	..	499	552	1,105
Beaufort	211	39	1	..	..	53	211	348
							2,437	3,868

4. Laboratory report:

Specimens examined	1,265
Specimens positive	393

5. Summary:

Number of persons examined.....	10,992
Number of persons treated by physicians.....	1,774
Number of persons treated by staff.....	3,246
	— 5,020

III. Educating the people in sanitation.

1. By public lectures:

(1) Number of lectures delivered.....	76
(2) Estimated number of persons reached by these lectures	8,416

2. Through the schools:

(1) Number of teachers in State.....	4,255
(2) Number of teachers reached by visit.....	752
(3) Number of teachers reached by bulletin or leaflet	1,500
(4) Number of teachers reached at institutes.....	900

3. By bulletins, leaflets and special literature:

(1) Number of bulletins and leaflets distributed..	27,057
--	--------

4. Through the public press:

(1) Number of papers in the State.....	..
(2) Number of papers personally visited.....	26
(3) Number of letters to press.....	..
(4) Number of articles furnished for publication.	30

IV. Notes on the work of the year.

1. The State Board of Health had an exhibit at the State fair in November. Exhibits were also made at county fairs.

2. The county dispensary work has been done in the face of great difficulties. Many of the counties have not authority to appropriate funds for this purpose. The appropriation for the State Board of Health is entirely inadequate. An effort will be made to get the next legislature to enact a law authorizing the counties to make appropriations for the dispensary work.

TENNESSEE.**I. State survey by counties.**

1. Infection survey,—based on an examination of at least 200 children between the ages of 6 and 18 years, taken at random from the country:

County.	Area in sq. miles.	Population.	Number examined.
Knox.....	520	74,302	581
Anderson.....	350	17,634	212
Sevier.....	588	22,021	155
Jefferson.....	310	18,560	201
Sullivan.....	430	24,935	200
White.....	370	14,157	200
Fentress.....	445	6,106	143
Pickett.....	165	5,366	167
Overton.....	459	13,353	186
Clay.....	260	8,421	200
Warren.....	444	16,410	478
Sequatchie.....	263	3,326	244
Bledsoe.....	400	6,626	304

2. Sanitary survey,—based on an inspection of privy conditions at, at least, 100 country homes:

County.	Total No. inspected.
Anderson.....	100
Sevier.....	200
Jefferson.....	100
White.....	200
Fentress.....	200
Pickett.....	200
Overton.....	200
Clay.....	200
Madison.....	407
Fayette.....	155
Warren.....	232
Cannon.....	306
Bledsoe.....	193
Sequatchie.....	200

II. Getting the people treated.

1. Enlisting the physicians:

	Total.
(1) Number of physicians in State.....	3,449
(2) Number of physicians personally interested.....	288
(3) Number of lectures to physicians.....	28
(4) Number of letters and circulars sent to physicians.....	5,956
(5) Number of bulletins sent to physicians.....	6,000
(6) Number of physicians now treating the disease....	256
(7) Number of persons treated by physicians.....	666

2. Getting the people to seek examination and treatment:

(1) Number of schools inspected.....	240
(2) Number of homes inspected.....	2,893
(3) Number of families examined.....	2,574
(4) Number of persons examined clinically.....	6,907
(5) Number of persons examined microscopically.....	7,876
(6) Number of specimens positive.....	3,335
(7) Total number of persons examined.....	14,783
(8) Number of persons treated by field force.....	2,069
(9) Total number of persons treated on record.....	2,735
(10) Estimated number of persons treated, not reported.	1,200

3. Work of county dispensaries:

County.	Amt. of appro.	Duration of campaign.
White.....	\$150.00	15 days
Fentress.....	25.00	5 weeks
Pickett.....	100.00	4 weeks
Warren.....	150.00	37 days
Clay.....	25.00	Not begun
Totals.....	\$450.00	19 weeks

County.	One.	Two.	Three.	Four.	Five.	Total No. people treated.	Total No. treat- ments.
White	191	24	7	3	1	191	226
Fentress... }	215	61	23	8	2	215	309
Pickett..... }							
Warren	259	136	87	1	..	259	483
	665	221	117	12	3	665	1,018

4. Report of laboratory:

(1) Total number of specimens examined.....	607
(2) Number containing hookworm ova.....	128
(3) Number containing Tricophalus dispar.....	19
(4) Number containing Oxyuris vermicularis.....	5
(5) Number containing Ascaris.....	89
(6) Number containing Tænia nana.....	10
(7) Number containing Tænia saginata.....	4

5. Summary:

1. Number of persons examined.....	14,783
2. Number of persons treated by physicians....	666
3. Number of persons treated by staff.....	2,069
	2,735

III. Educating the people in sanitation.

1. By public lectures:

(1) Number of public lectures delivered.....	300
(2) Estimated number of persons reached.....	45,898

2. Through the schools:

(1) Number of teachers in State.....	8,466
(2) Number of teachers reached by visit.....	1,230
(3) Number of teachers reached by letter.....	535
(4) Number of teachers reached by bulletins.....	1,756
(5) Number of teachers reached at institutes.....	1,200

3. By bulletins, leaflets, and special literature:

(1) Total number of bulletins and leaflets distributed.. 55,540

4. Through the press:

(1) Number of papers in State.....	319
(2) Number of papers personally visited.....	45
(3) Number of letters to press.....	110
(4) Number of articles furnished for publication.....	123

IV. Notes on the work of the year.

1. Sentiment has been created for specific health legislation, which we hope will result in the passage of important public-health measures at the next session of the legislature.

2. Sanitary ordinances were enacted in three towns. These ordinances require the immediate building of sanitary closets at all homes.

3. The county boards of education in White, Sevier, Scott, Clay, Madison, Warren, Cannon, and Davidson counties have ordered sanitary closets built for all public schools.

4. Our work has received endorsement and commendation in resolutions adopted by medical societies, teachers' associations, boards of education, boards of health, county courts, and other organizations.

5. In October and November for five weeks a special train, called "The Agriculture-Health-Education Special," was run over the lines of the Southern Railway in east Tennessee. The train was composed of eight cars; it contained exhibits from the departments of agriculture, health, and education. One of the most extensive exhibits was that devoted to hook-worm disease. A laboratory was carried on the car and demonstrations and diagnoses were made throughout the trip. The exhibit was seen by more than 40,000 persons; more than 250,000 pieces of literature were distributed.

6. Infection has been demonstrated in every county in the State except Lewis; we have had no opportunity for investigation in this county.

7. Active field work has been prosecuted in four west Tennessee counties, in eleven east Tennessee counties, and in four middle Tennessee counties. The heaviest infection has been found in the highland counties of middle Tennessee and those immediately adjacent in east Tennessee. The infection surveys in these counties show an infection ranging from 48 per cent to 73 per cent among rural children of school age.

8. It is not possible to give accurate information concerning the number of physicians now treating cases. We are constantly hearing of cases treated concerning which we have had no information from the physicians.

9. The dispensaries have been successful. We have not been able to report large numbers of cases treated. The thing which most interfered with dispensary work was the unusually inclement weather, which has continued from the opening until the present time. The work that has been done has been thoroughly done, and we expect each case to be a living, walking advertisement for the work. The people are watching, they are seeing, and they are being convinced. Individual members of all the county courts making the appropriations have expressed themselves as pleased with what has been accomplished.

10. The growth of sentiment in favor of sanitation cannot be expressed in words and figures. That there has been a wonderful increase of interest along this line can be discovered in casual conversations in any community where the work has been prosecuted.

VIRGINIA.

I. State survey by counties.

1. Infection survey,—based on an examination of at least 200 children between the ages of 6 and 18 years, taken at random from the country:

County.	Area in sq. miles.	Population.	Number examined.
Brunswick.....	529	19,244	361
Campbell.....	554	52,537	425
Halifax.....	806	40,044	252
Lunenburg.....	471	12,780	478
Mecklenburg.....	640	28,956	947
Northumberland.....	235	10,777	219
Pittsylvania.....	986	69,729	343
Richmond.....	188	7,415	516
Southampton.....	609	26,302	286
Westmoreland.....	245	9,313	223

2. Sanitary survey,—based on an inspection of privy conditions at, at least, 100 country homes:

County.	Total No. inspected.
Brunswick	103
Campbell.....	228
Halifax	150
King George	204
Lancaster	154
Lunenburg	150
Mathews	138
Mecklenburg	212
Middlesex	175
Northumberland	146
Pittsylvania	224
Richmond	270
Southampton	182
Westmoreland	115

II. Getting the people treated.

I. Enlisting the physicians:	Total.
Number of physicians in State.....	2,300
Number of physicians personally interested.....	508
Number of lectures to physicians.....	49
Number of physicians reached	1,250
Number of letters and circulars sent to physicians.....	25,555
Number of bulletins sent to physicians.....	9,200
Number of physicians now treating disease.....	513
Number of persons treated by physicians.....	4,420

2. Getting the people to seek examination and treatment:

Number of schools inspected	714
Number of families examined	1,220
Number of persons examined clinically.....	15,404
Number of persons examined microscopically.....	6,986
Number positive	2,374
Total number of persons examined.....	23,300
Number of persons treated by field force.....	4,448
Total number of persons treated on record.....	8,868
Estimated number of persons treated, not reported.....	5,000

3. Work of county dispensaries:

County.	Amt. of appro.	Duration of campaign.	Expenditures.
Halifax.....	\$100.00	24 days	\$77.30
Lunenburg.....	.....	24 days	.....
Pittsylvania.....	200.00	42 days	.....
	<u>\$300.00</u>	<u>90 days</u>	<u>\$77.30</u>

County.	No. persons and times treated.						Total No. people treated.	Total No. treat- ments.
	One.	Two.	Three.	Four.	Five.	Six.		
Halifax	240	179	5	..	..	..	240	414
Lunenburg	150	123	20	19	1	1	150	314
Pittsylvania	204	115	3	1	1	1	204	326
Totals	594	417	29	20	2	2	594	1,064

4. Report of laboratory:

	Percentage.
(1) Total number of specimens examined.....	4,369
(2) Number showing hookworm infection.....	1,416
(3) Number of specimens negative.....	2,384
(4) Number of specimens showing roundworm infection	491
(5) Number of specimens showing other parasites.....	78
(6) Number of specimens examined for intestinal parasites	1,911

5. Summary:

1. Number of persons examined.....	22,390
2. Number of persons treated by physicians....	4,420
3. Number of persons treated by staff.....	4,448
4. Total persons treated.....	8,868

III. Educating the people in sanitation.

By public lectures:

Number of public lectures delivered.....	874
Estimated number of persons reached.....	93,499

2. Through the schools:

(1) Number of teachers in State.....	9,000
(2) Number of teachers reached by visit.....	1,215
(3) Number of teachers reached by letter.....	2,250
(4) Number of teachers reached by bulletins.....	9,000
(5) Number of teachers reached at institutes.....	2,500

3. By bulletins, leaflets and special literature:

(1) Total number of bulletins and leaflets distributed	44,500
--	--------

4. Through the public press:

(1) Number of papers in State.....	268
(2) Number of papers personally visited.....	42
(3) Number of letters to press.....	125
(4) Number of articles furnished for publication.....	116

IV. Notes on the work of the year.

1. Regulations by the State Board of Health adopted in July, 1910, requiring sanitary privies at all the public schools went into effect January 1, 1911. These regulations were adopted by the State Board of Education and published as a part of the State law. The work of building sanitary privies at the schools has been in progress, though it was not expected that the work would be completed within one year.

2. Alexandria county has adopted a privy regulation and is enforcing it.

3. City and town boards of health and councils have adopted privy ordinances during the year as follows: Fredericksburg, Roanoke, Ballston, Basic City, Blacksburg, Boydton, Chase City, Crewe, Emporia, Floyd, Fordwick, Gordonsville, Kenbridge, Lexington, Pinners, Smithfield, South Hill, Stuart, Waynesboro, Williamsburg, Victoria. In Williamsburg the installation of sanitary privies was followed by a reduction in the number of cases of typhoid from an average of 30 a year to 4 for 1911. In addition to the towns adopting and enforcing the privy regulations, two towns, Chase City and Law-

renceville, are issuing bonds for sewers and several other towns are contemplating the same step.

4. In Richmond county all white schools have been provided with two sanitary privies; colored schools are being equipped. In Lancaster county trustees and supervisors have agreed in writing to furnish two sanitary privies for every school; the work is in progress. In Northumberland and Westmoreland counties similar action was taken; work is in progress. In Lunenburg county the trustees have ordered privies for all schools; some have been installed. In Mecklenberg county school trustees requested that funds be provided by supervisors for privies at all schools; so far supervisors have not appropriated the funds. In Greenesville county trustees have agreed to equip all schools by fall of 1912; work is in progress. In Halifax trustees have ordered privies at all schools; work is in progress. In Campbell county resolution ordering privies at all schools has been adopted, but work has not yet begun.

5. In cities and towns, according to reports of mayors and health officers, at least 4,500 privies have been built. In schools in rural districts there have been installed 135 privies by count. In homes in rural districts, 204 privies of which we have record.

6. In districts in which active work has been done local boards have been much strengthened. The policy of the State Board of Health is to remove from local boards members who do not coöperate with the hookworm work. This has been done in one case and the reason therefor communicated to the member removed.

CHAPTER III.

GENERAL SUMMARY.

TABLE 2.—*Infection Survey—Summary.*

State.	No. counties surveyed.	No. children examined.
Alabama.....	2	840
Arkansas.....	9	2,685
Georgia.....	2	568
Louisiana.....	10	3,638
Mississippi.....	17	9,561
North Carolina.....	21	11,466
South Carolina.....	3	1,188
Tennessee.....	13	3,271
Virginia.....	10	4,050
Total	87	37,267

Percentage of infection by counties ranges from 2.5 to 90.2.

GENERAL SUMMARY.

TABLE 3.—*Enlisting the Physicians.*

State.	Number of physicians in State.	Number of physicians personally instructed.	Number of lectures given to physicians.	Number of physicians reached.	Number of letters and circulars sent to physicians.	Number of bulletins sent to physicians.	Physicians now treating the disease.
Alabama.....	2,200	227	22	294	1,200	....	227
Arkansas.....	3,600	675	49	750	7,500	5,000	200
Georgia.....	2,887	482	11	429	2,887	2,887	690
Louisiana.....	2,033	791	12	696	6,500	4,627	159
Mississippi.....	1,783	1,350	16	831	5,835	21,336	786
North Carolina.....	1,879	676	11	300	7,061	3,130	1,195
South Carolina.....	1,113	228	8	350	2,226	4,000	100
Tennessee.....	3,449	288	28	....	5,956	6,000	256
Virginia.....	2,300	508	49	1,250	25,555	9,200	513

Total number of physicians in eight States..... 21,244

Total number now treating the disease..... 4,126

GENERAL SUMMARY.

69

TABLE 4.—*Dispensary Summary.*

State.	Number of persons and times treated.						Total No. persons treated.	Total No. treatments.
	One.	Two.	Three.	Four.	Five.	Six.		
Alabama	19,489	3,492	751	....	....	....	19,489	23,732
Arkansas	287	185	55	10	....	....	287	537
Georgia	972	111	12	4	1	....	972	1,100
Louisiana	5,001	1,402	521	121	3	1	5,001	7,049
Mississippi ..	15,388	8,389	4,898	1,370	104	6	15,388	30,155
North Carolina	29,172	6,251	2,418	648	22	....	29,172	38,511
South Carolina	2,437	671	199	12	3	(?) 552	2,437	3,874
Tennessee	665	221	117	12	3	....	665	1,018
Virginia	594	417	29	20	2	2	594	1,064
Total	74,005	21,139	9,000	2,197	138	561	74,005	107,040

TABLE 5.—*Dispensary Summary.*

State.	Number of counties operating.	Duration of campaign.	Total appropriated by counties.
Alabama	12	83 weeks.	\$2,035.00
Arkansas.....	1	3 weeks.	50.00
Georgia.....	2	12 weeks.	300.00
Louisiana	9	24 weeks.	1,150.00
Mississippi.....	13	64 weeks.	2,114.60
North Carolina.....	17	91 weeks.	4,300.00
South Carolina.....	4	38 weeks.	.....
Tennessee.....	5	19 weeks.	550.00
Virginia	3	15 weeks.	300.00
Total.....	66	349 weeks.	10,799.60

Total number of counties making appropriations for dispensaries.....	85
Total amount appropriated.....	\$10,799.60
Total number persons treated by dispensaries.....	74,005

TABLE 6.—*Sanitary Survey.*

State.	No. of counties surveyed.	No. of homes inspected.
Alabama	7	2,502
Arkansas	11	6,159
Georgia	11	4,981
Louisiana	11	6,485
Mississippi	9	2,428
North Carolina	44	13,251
South Carolina	4	2,293
Tennessee	14	2,898
Virginia	14	2,451
Total.....	125	43,448

GENERAL SUMMARY.

71

TABLE 7.—*Pulling a Stop to Soil Pollution—Educating the People.*

State.	Through the schools.				Through public lectures.	
	Number of teachers in State.	Teachers reached.			Number of lectures given.	Estimated number of persons reached by these lectures.
		By visit.	By letter.	By bulletin or leaflet.		
Alabama.....	6,434	361	380	410	161	15,000
Arkansas.....	9,522	805	5,400	5,400	337	50,550
Georgia.....	8,714	845	"only a few"	7,500	621	50,958
Louisiana.....	4,981	1,760	2,378	4,000	466	97,237
Mississippi.....	5,440	1,500	1,226	5,440	302	51,640
North Carolina.....	8,422	982	5,115	8,387	483	39,579
South Carolina.....	4,255	752	.....	1,500	76	8,416
Tennessee.....	8,466	1,230	545	1,756	300	45,898
Virginia.....	9,000	1,215	2,230	9,000	874	93,499
Total.....	65,234	9,450	17,294	43,393	3,620	451,877

TABLE 8.—*Putting a Stop to Soil Pollution—Educating the People.*

State.	Through bulletins.		Through the press.				Attitude of press.
	Number of bulletins and leaflets distributed.	Papers in State.	Number personally visited.	Letters to press.	Articles furnished for publication.		
Alabama	71,000	258	19	....	49	"Very favorable."
Arkansas.....	61,324	310	35	360	110	"Generally favorable."	
Georgia.....	33,988	375	81	295	655	"* * * Every paper in State save three is supporting this movement."	
Louisiana.....	62,027	219	104	1,200	150	"Good—gave all the space necessary."	
Mississippi.....	246,000	258	130	150	310	"Generally favorable and many very active."	
North Carolina.....	307,000	306	191	3,345	300	"Excellent."	
South Carolina.....	27,057	177	26	177	30	"Favorable."	
Tennessee.....	55,540	319	45	110	123	"Generally favorable."	
Virginia.....	44,500	268	42	125	116	"Almost without exception enthusiastic support."	
Total.....	908,436	2,490	673	5,762	1,843		

TABLE 9.—*Examinations and Treatments.*

State.	Examinations.			Persons treated		
	Clinical.	Microscopical.	Total.	By physicians.	By staff.	Total.
Alabama	33,931	2,640	36,571	3,870	19,489	23,359
Arkansas	4,000	3,460	7,460	1,500	287	1,787
Georgia	28,932	7,816	36,748	7,228	972	8,200
Kentucky .....	.....	834	834	.....	.....	.....
Louisiana	28,978	5,975	34,953	1,197	8,232	9,429
Mississippi	21,194	14,757	35,951	15,803	19,296	35,099
North Carolina	47,289	37,328	84,617	16,709	29,172	45,881
South Carolina	7,940	3,052	10,992	1,774	3,246	5,020
Tennessee	6,907	7,876	14,783	666	2,069	2,735
Virginia	15,404	6,986	22,390	4,420	4,448	8,868
Total	194,575	90,724	285,299	53,167	87,211	140,378

TABLE 10.—*Summary of Expenditures.*

	By State.	By Commission.		Total.
		For salaries and expenses.	For equip- ment.	
Alabama	\$3,088.75	\$10,401.98	.....	\$13,490.73
Arkansas	50.00	12,709.33	\$566.73	13,426.06
Georgia	1,802.30	17,011.03	.....	18,813.33
Louisiana	5,995.00	9,949.35	548.25	16,492.60
Mississippi	7,014.00	17,253.38	250.70	24,518.08
North Carolina..	9,300.00	18,503.16	117.90	27,921.06
South Carolina..	291.98	11,963.82	170.10	12,425.90
Tennessee	1,546.70	15,041.11	289.80	16,877.61
Virginia	1,300.00	14,349.93	428.50	16,078.43
Total.....	\$30,388.73	\$127,183.09	\$2,471.98	\$160,043.80
Administrative expenses:				
Administrative Secretary's office.....				\$14,384.62
Scientific Secretary's office.....				3,806.28
Treasurer's office				561.17
				<hr/>
				\$18,752.07

CHAPTER IV.

EXHIBITS.

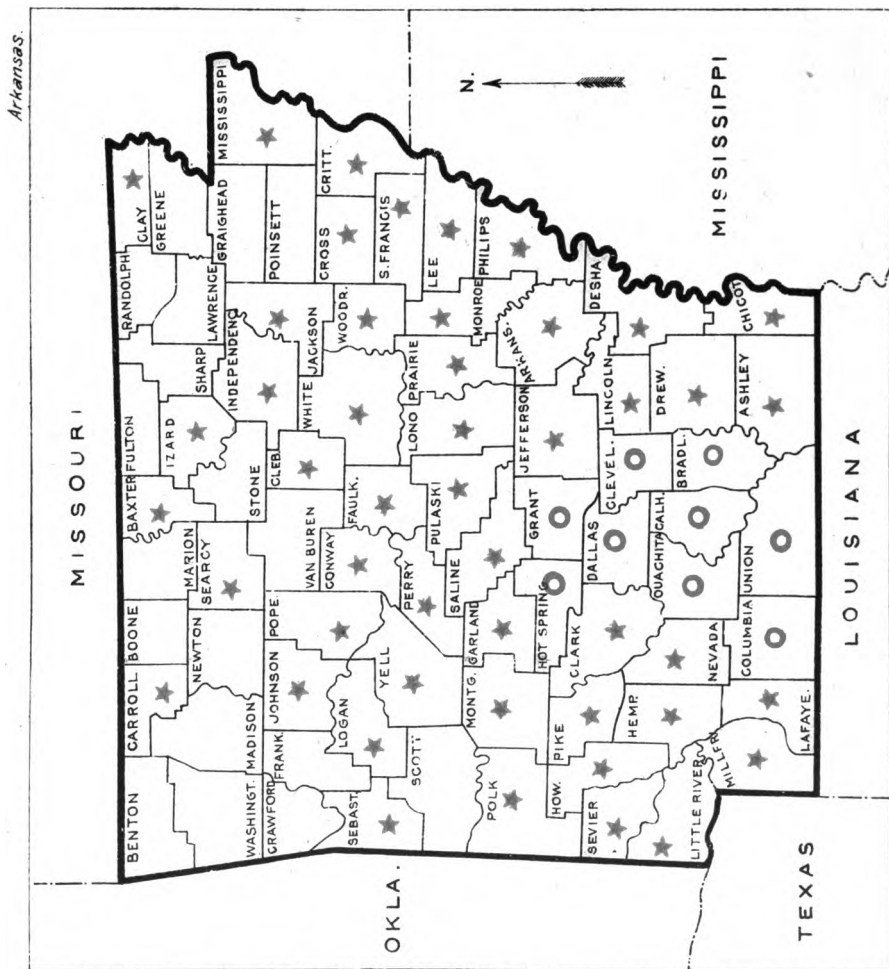
- I. **Maps I to II, showing distribution of hookworm infection in eleven States.**

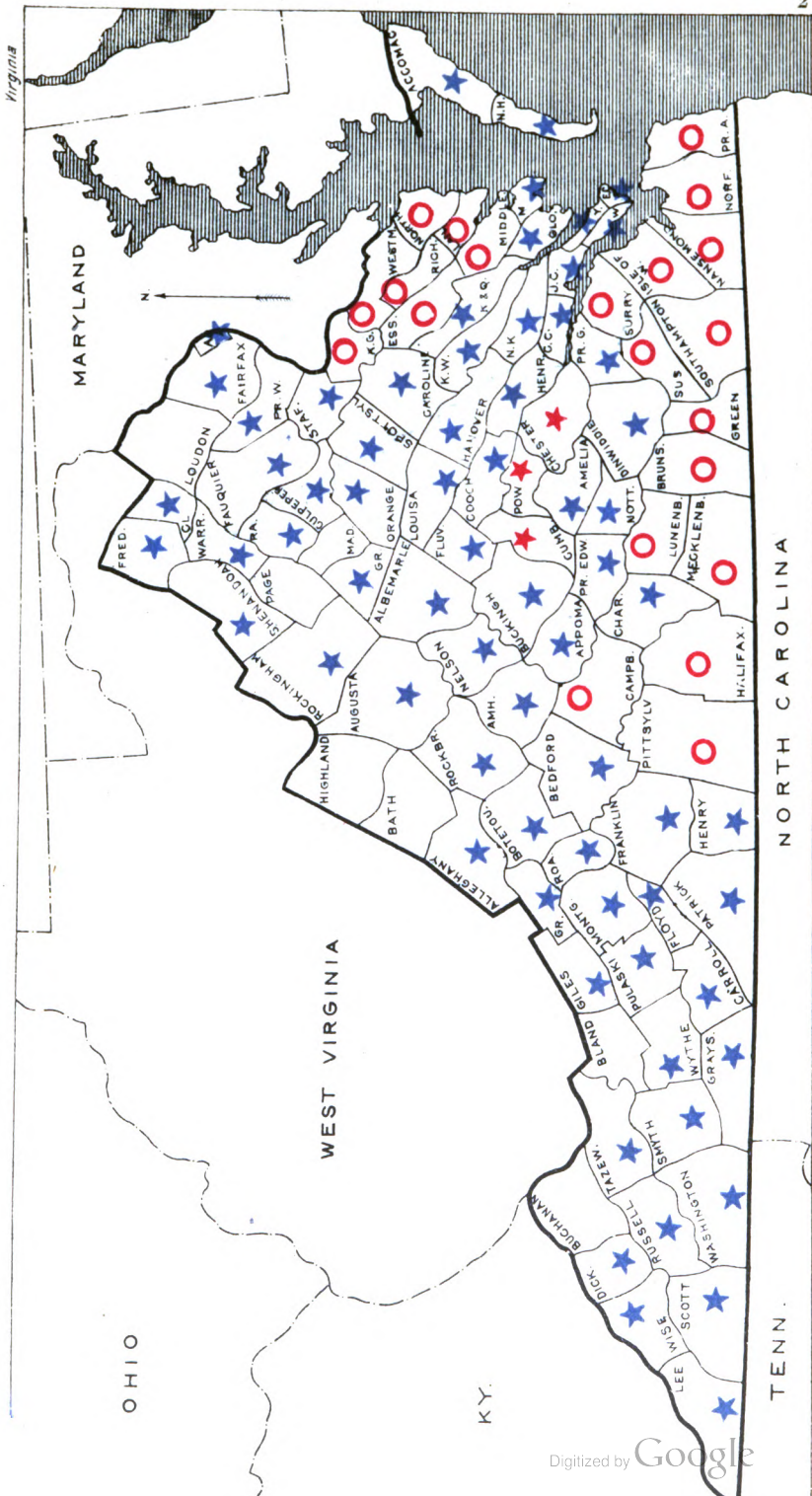
KEY TO MAPS I TO IO.

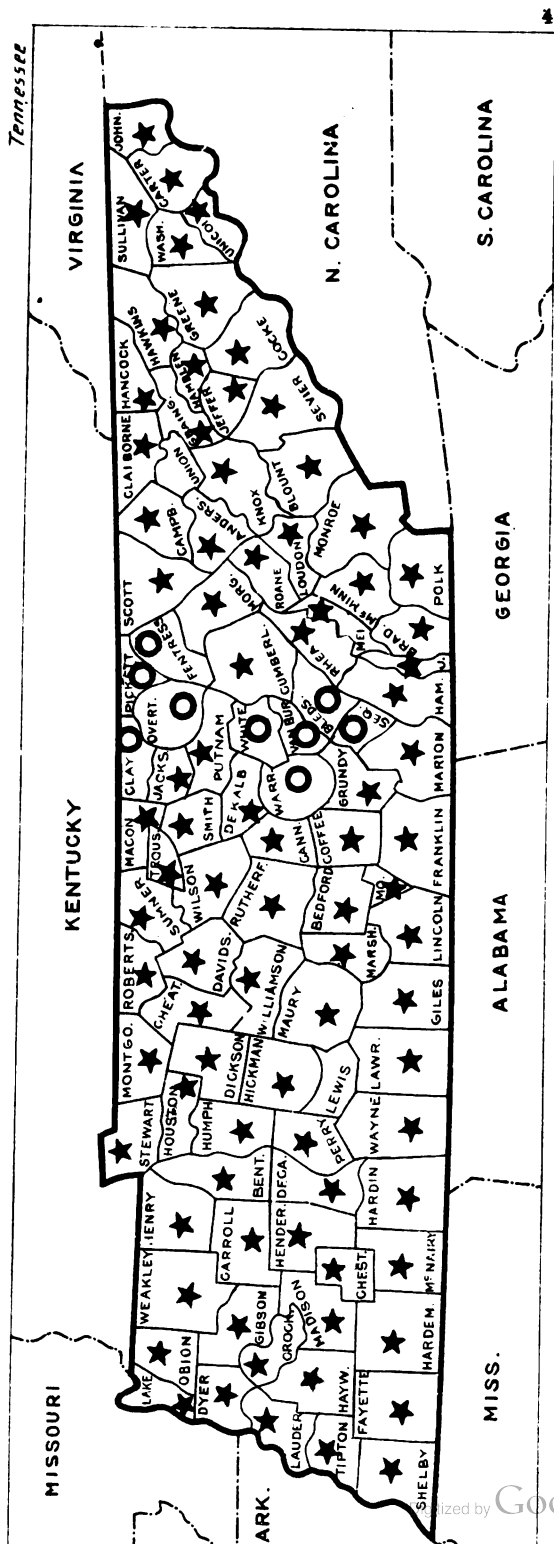
Red Circle.—Infection heavy.

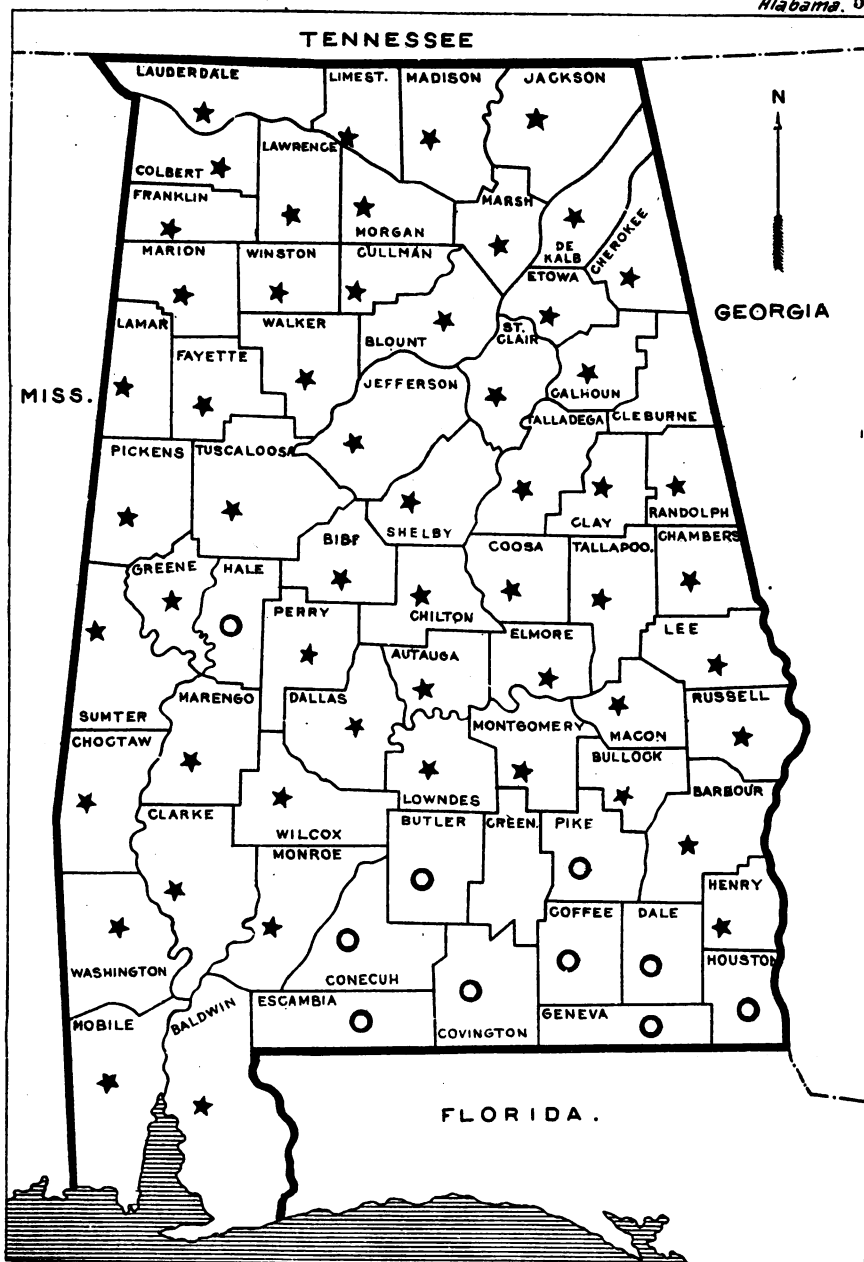
Red Star.—Infection light.

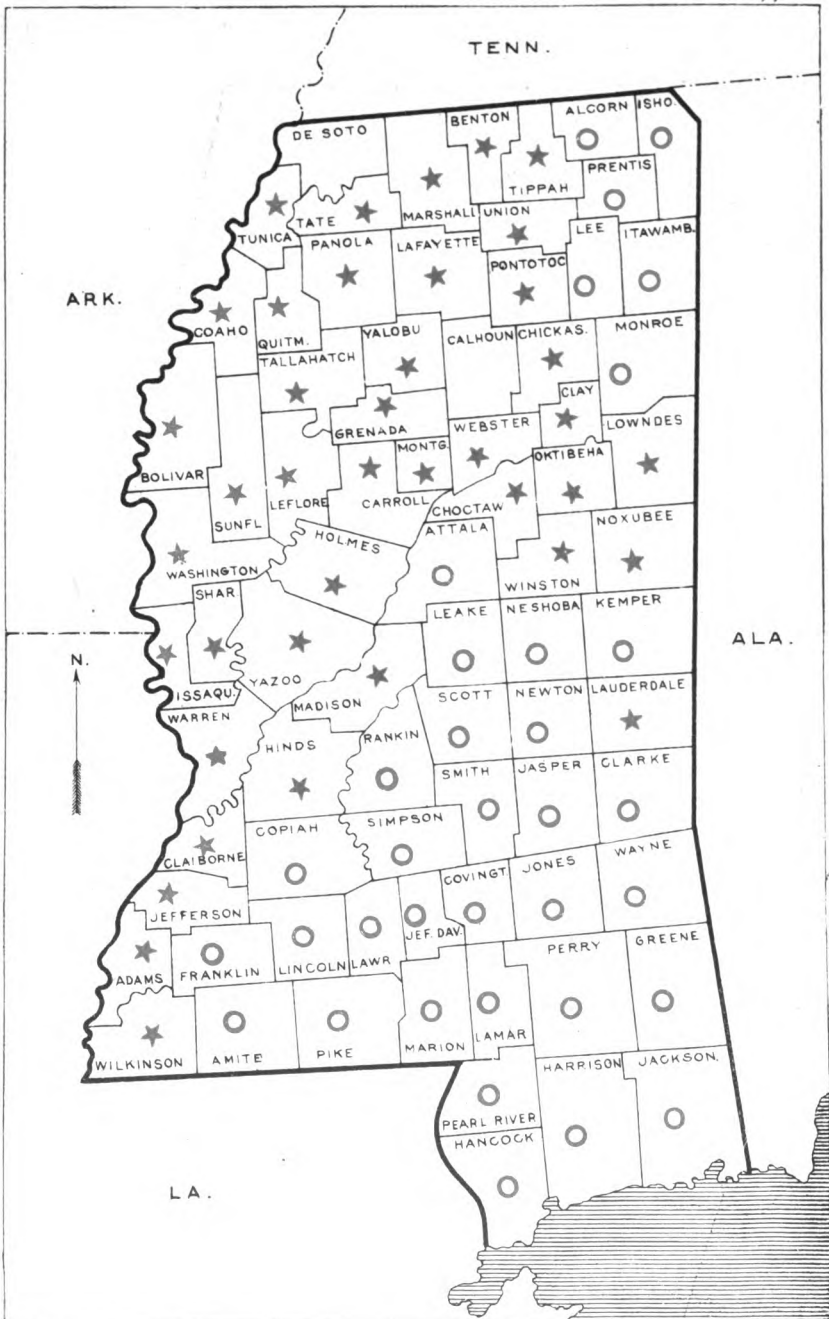
Blue Star.—Infection demonstrated ; degree not determined.

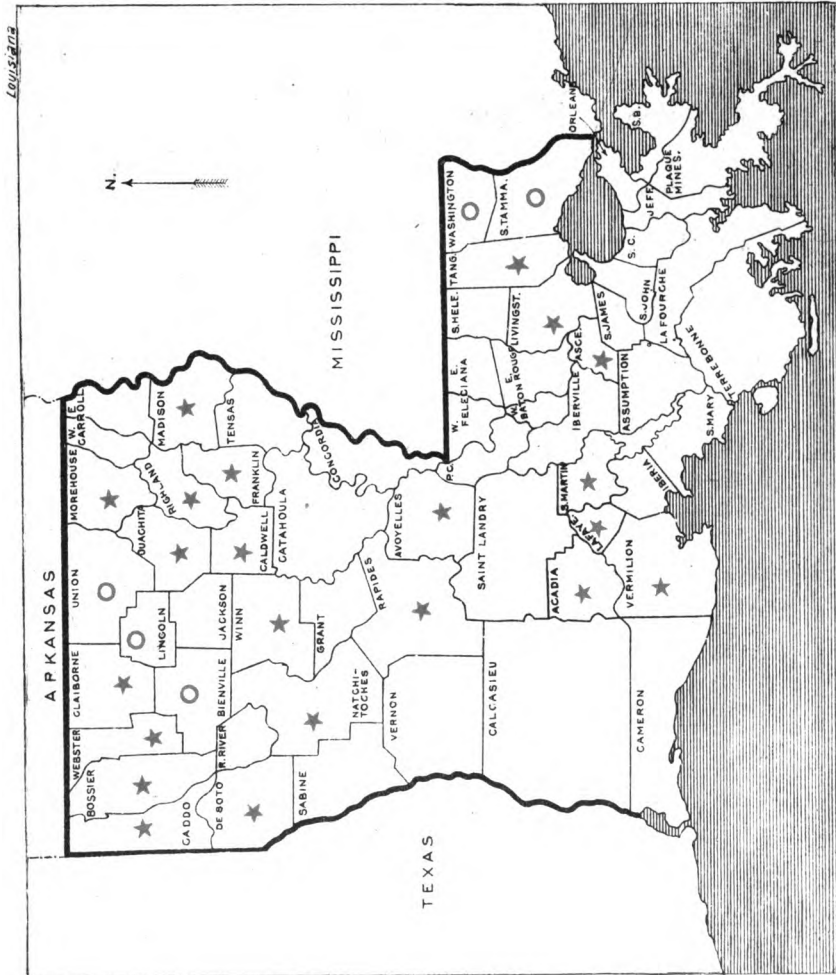


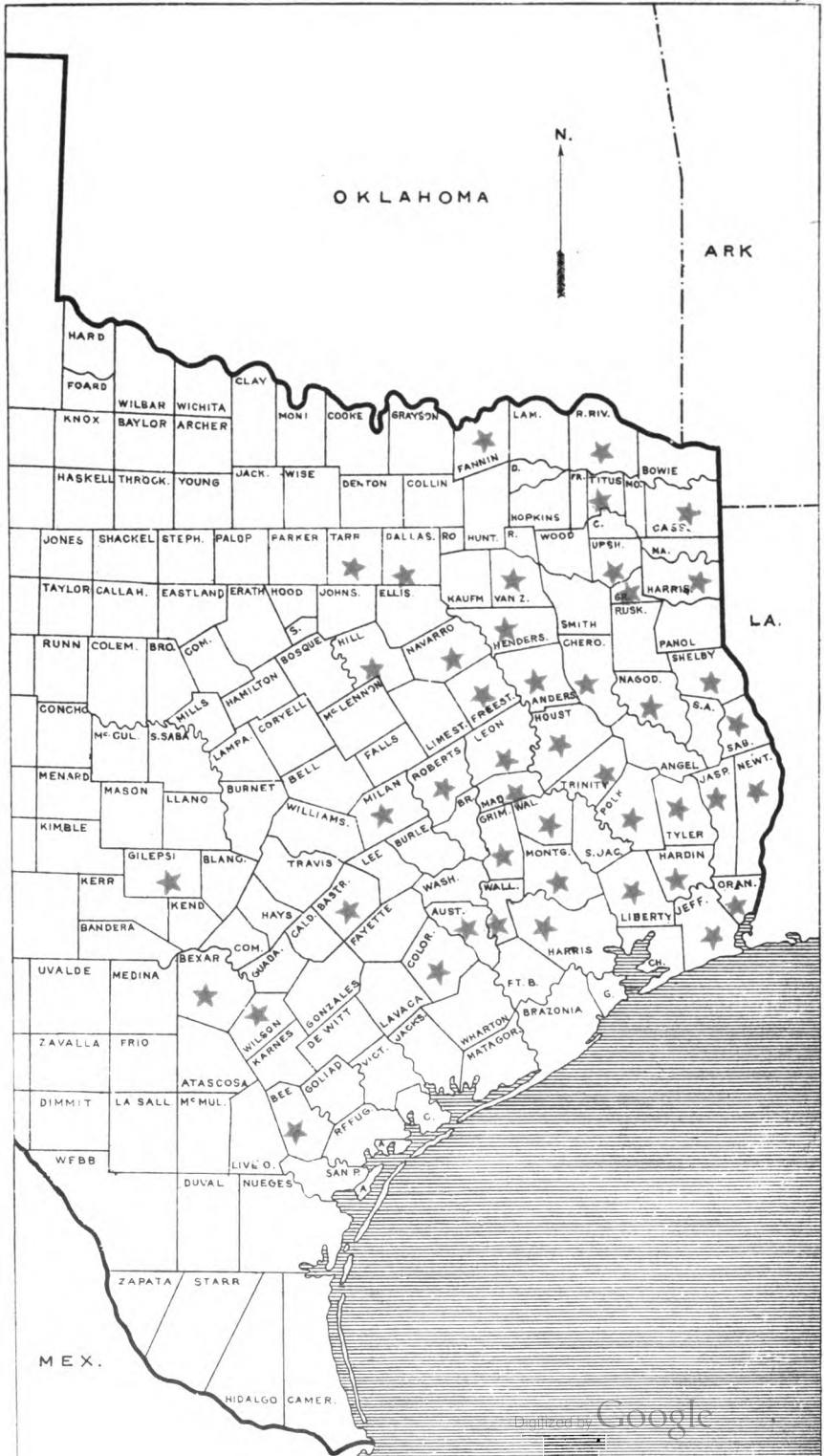


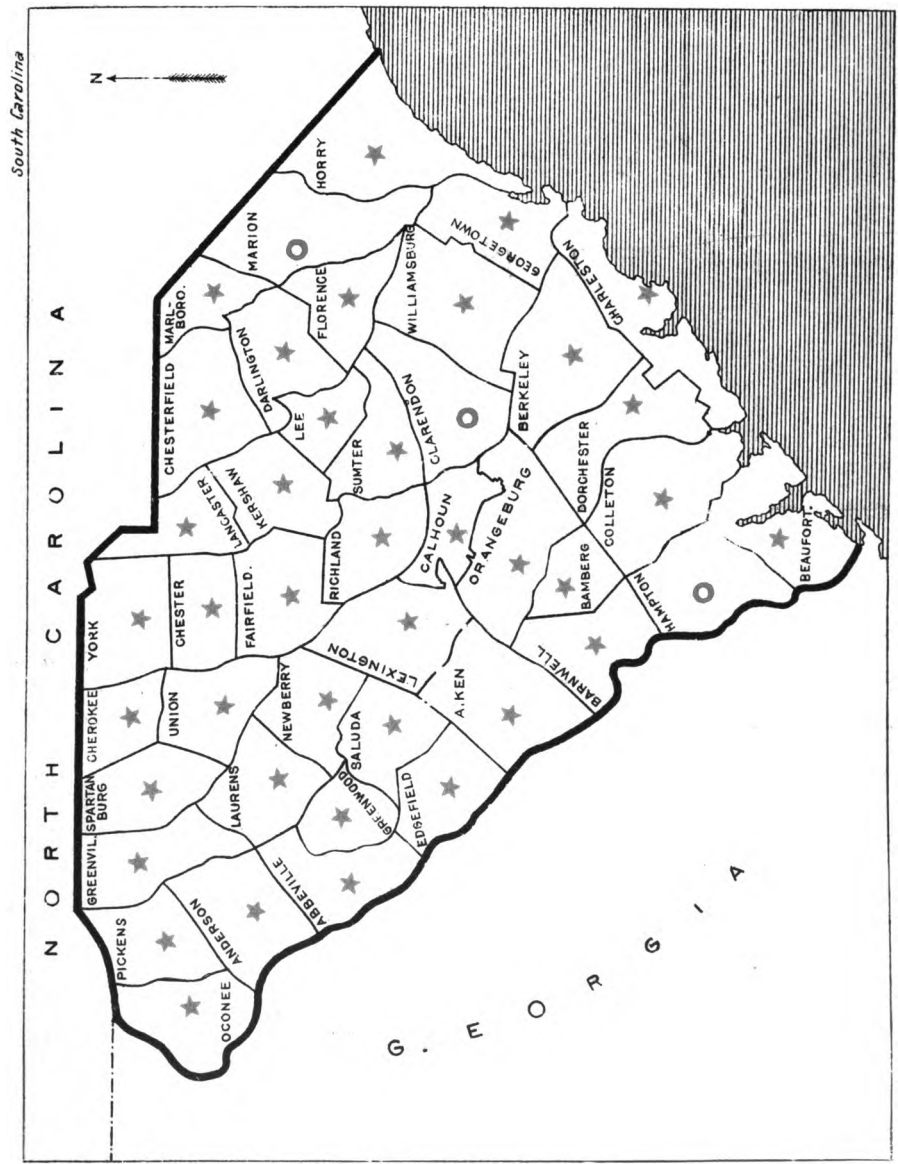


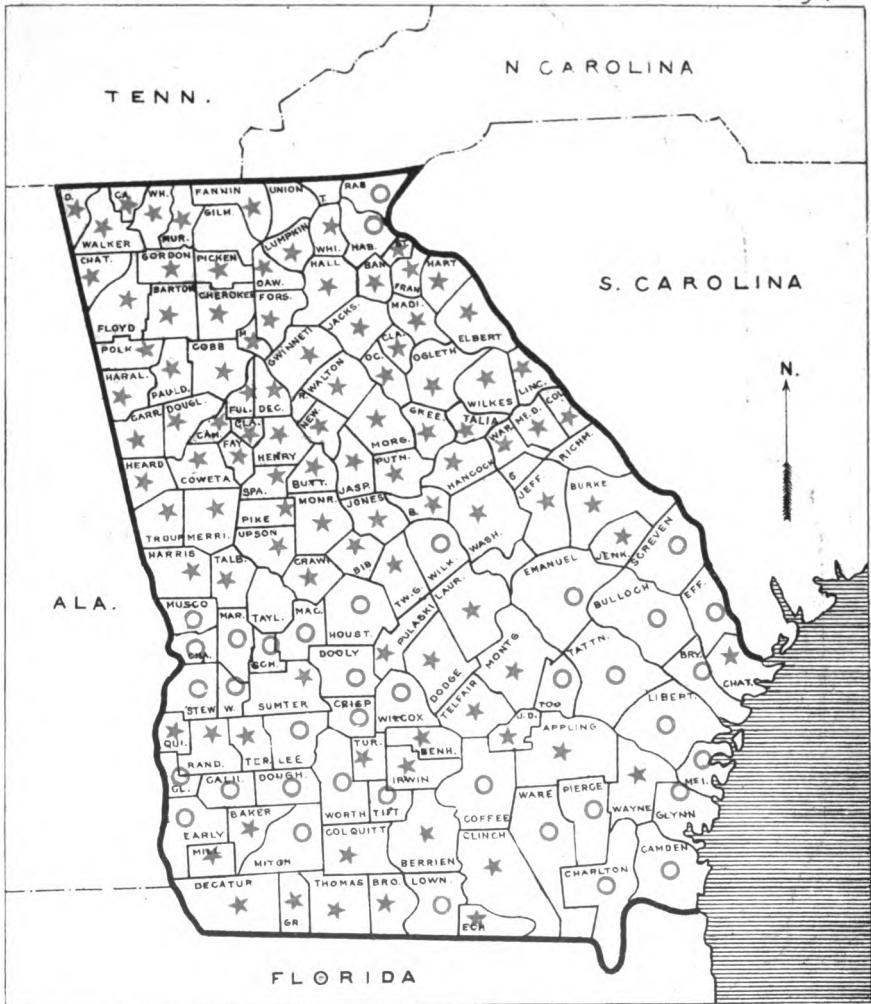






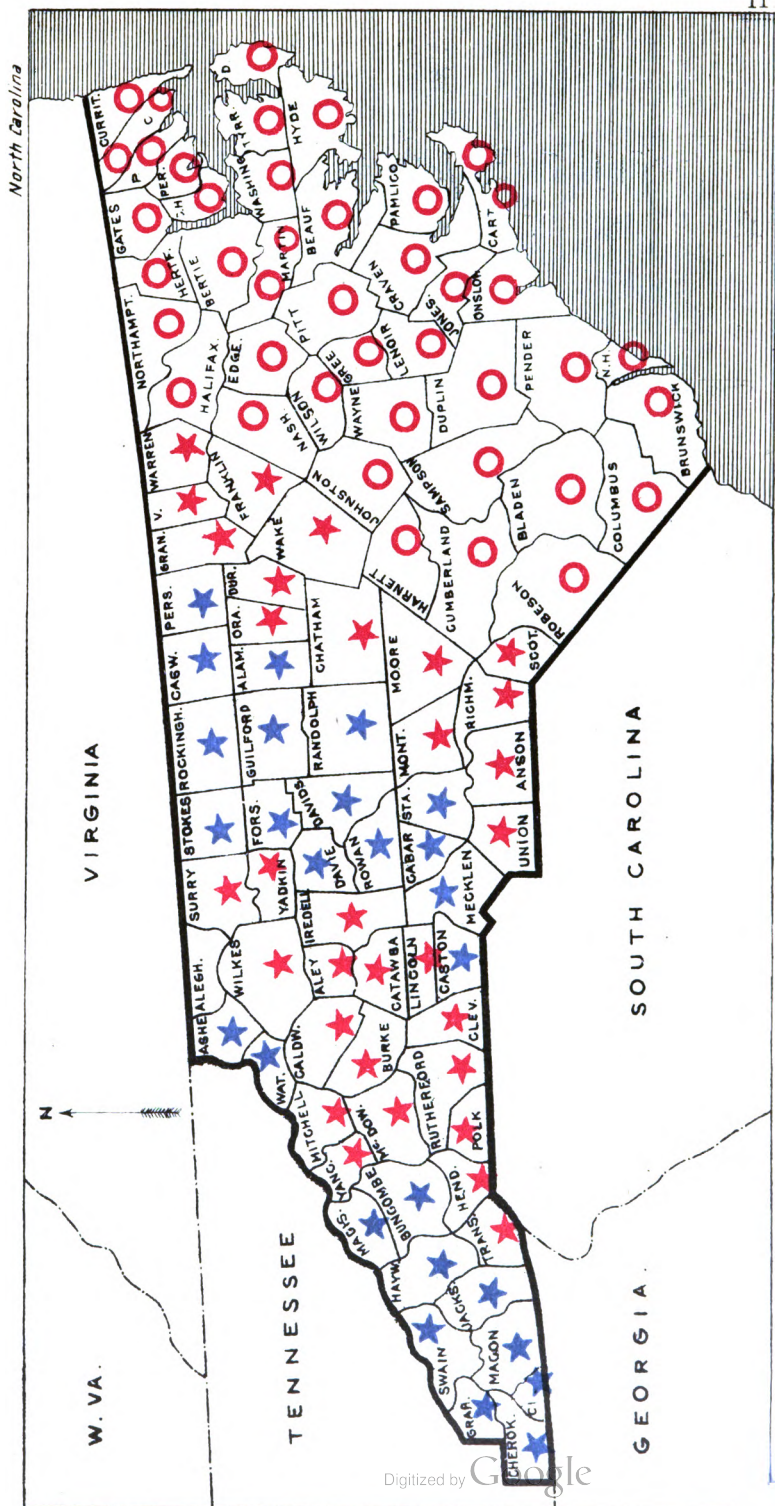






KEY TO MAP OF NORTH CAROLINA:

- INFECTION HEAVY
- ★ INFECTION MEDIUM
- ★ INFECTION LIGHT



*Forty-six Foreign Countries in Which the Infection is
Widespread.*

I. AFRICA:		
	Area (sq. mi.).	Population.
1. Algeria	184,474	4,739,556
2. British East Africa and Zanzibar	640	150,000
3. Egypt	400,000	9,734,405
4. Gold Coast Colony.....	40,000	474,000
5. Lagos and Yuraba.....	28,910	1,500,000
6. Natal	42,019	983,118
7. Sierra Leone.....	4,000	76,655
8. Tunis	51,000	1,900,000
II. AMERICAS, THE:		
9. Antigua	108	35,000
10. Barbados	166	195,588
11. Brazil	3,218,130	14,333,915
12. British Guiana	104,000	278,328
13. British Honduras	7,562	37,479
14. Colombia	473,202	3,593,600
15. Dominican Republic	18,755	417,000
16. Dutch Guiana or Surinam.....	46,060	67,128
17. Ecuador	116,000	1,205,600
18. French Guiana	30,500	32,908
19. Guatemala	48,290	1,747,000
20. Honduras	46,250	487,500
21. Jamaica	4,193	743,000
22. Martinique	381	164,000
23. Mexico	767,005	13,570,545
24. Nicaragua	49,200	380,000
25. Paraguay	157,000	432,000
26. Panama	31,571	285,000
27. Peru	463,747	2,660,881
28. Porto Rico.....	3,606	953,243
29. Salvador	7,225	1,006,848
30. Trinidad	1,754	253,000
31. Venezuela	593,943	2,323,527

III. ASIA:

32. Ceylon	25,333	3,578,333
33. China	4,277,170	426,047,325
34. Cochin China.....	23,160	2,400,000
35. India	1,766,642	294,361,056
36. Japan	161,198	46,453,249
37. Java	50,554	26,125,000
38. Korea	82,000	10,528,937
39. Malay States.....	26,500	676,000
40. Philippine Islands.....	114,326	7,000,000
41. Samoa	181	55,000
42. Straits Settlements.....	11,543	572,000
43. Sumatra	162,310	3,472,000
44. Turkish Province of Bagdad....	54,503	850,000

IV. AUSTRALIA:

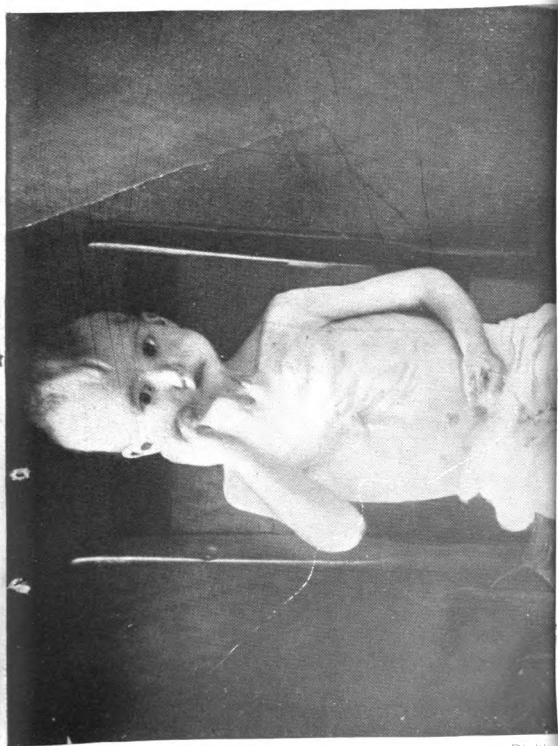
45. Queensland	668,497	503,266
----------------------	---------	---------

V. EUROPE:

46. Italy	110,550	32,475,253
	<hr/>	<hr/>
	14,464,158	919,858,243

2. Photographs showing:

- (1) Typical cases of hookworm disease and infected groups. Figures 1-6.
- (2) Results of treatment. Figures 7-9.
- (3) Dispensary groups. Figures 10-16.



bi
it

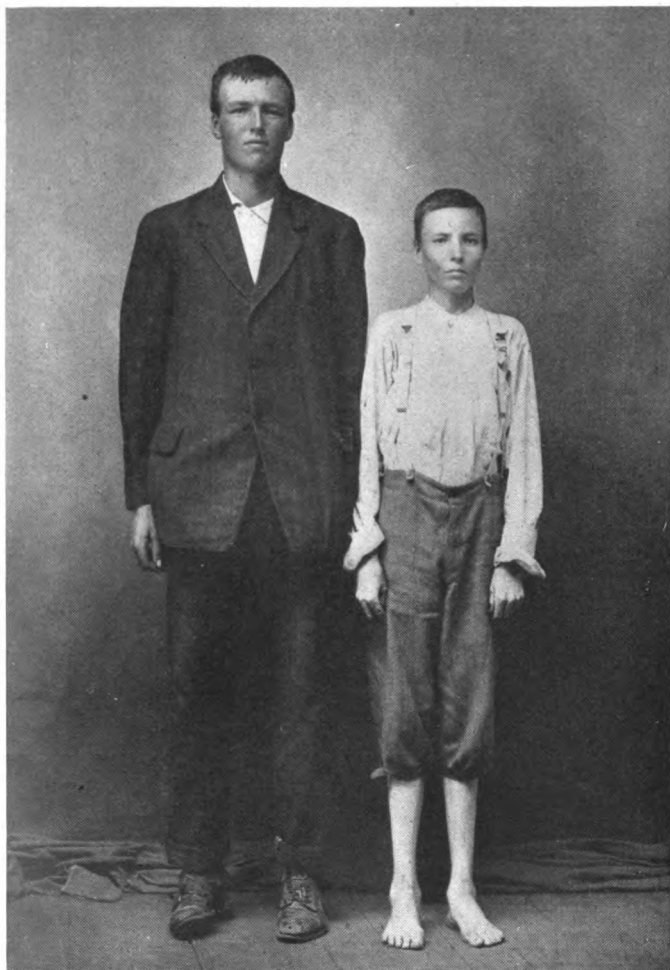


FIG. 2.—Showing dwarfing effect of the disease. These boys are others. Jones County, Miss. No. 1, age 17, weight 156 pounds; light infection. No. 2, age 18, weight 74 pounds; heavy infection.



FIG. 3.—Family group, ——— County, Ga. All infected; the mother and 17-year-old son very severe cases.



FIG. 4.—Family group, Kentucky. Sturdy stock; suffering the handicap of a light infection.

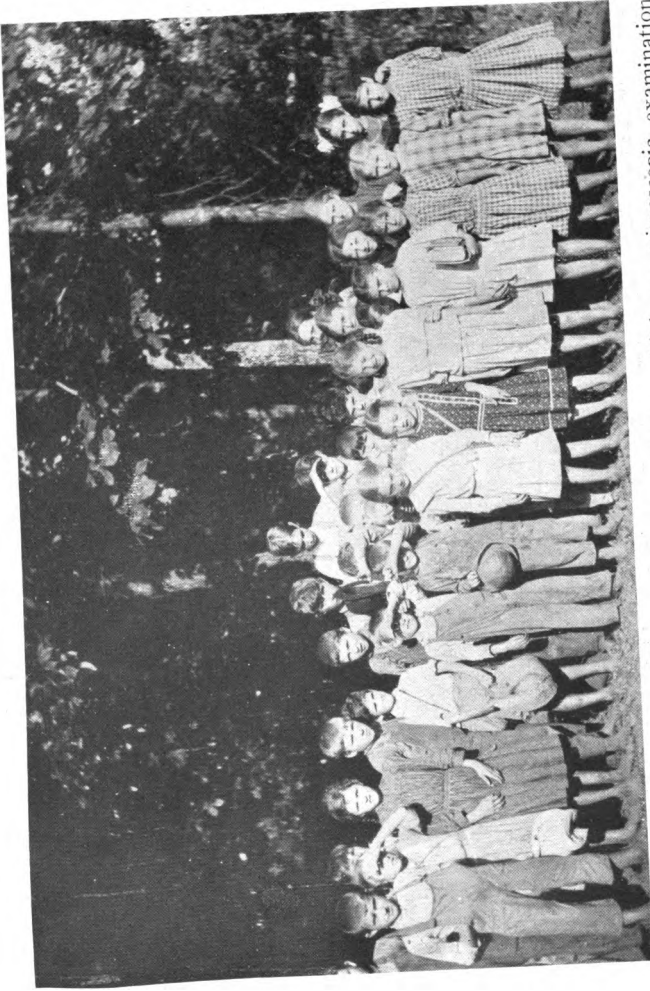


FIG. 5.—School in Hot Springs County, Ark. Thirty children; microscopic examination shows all infected.



FIG. 6.—School in Tift County, Ga. Twenty-four children; microscopic examination showed all infected. All have been treated.

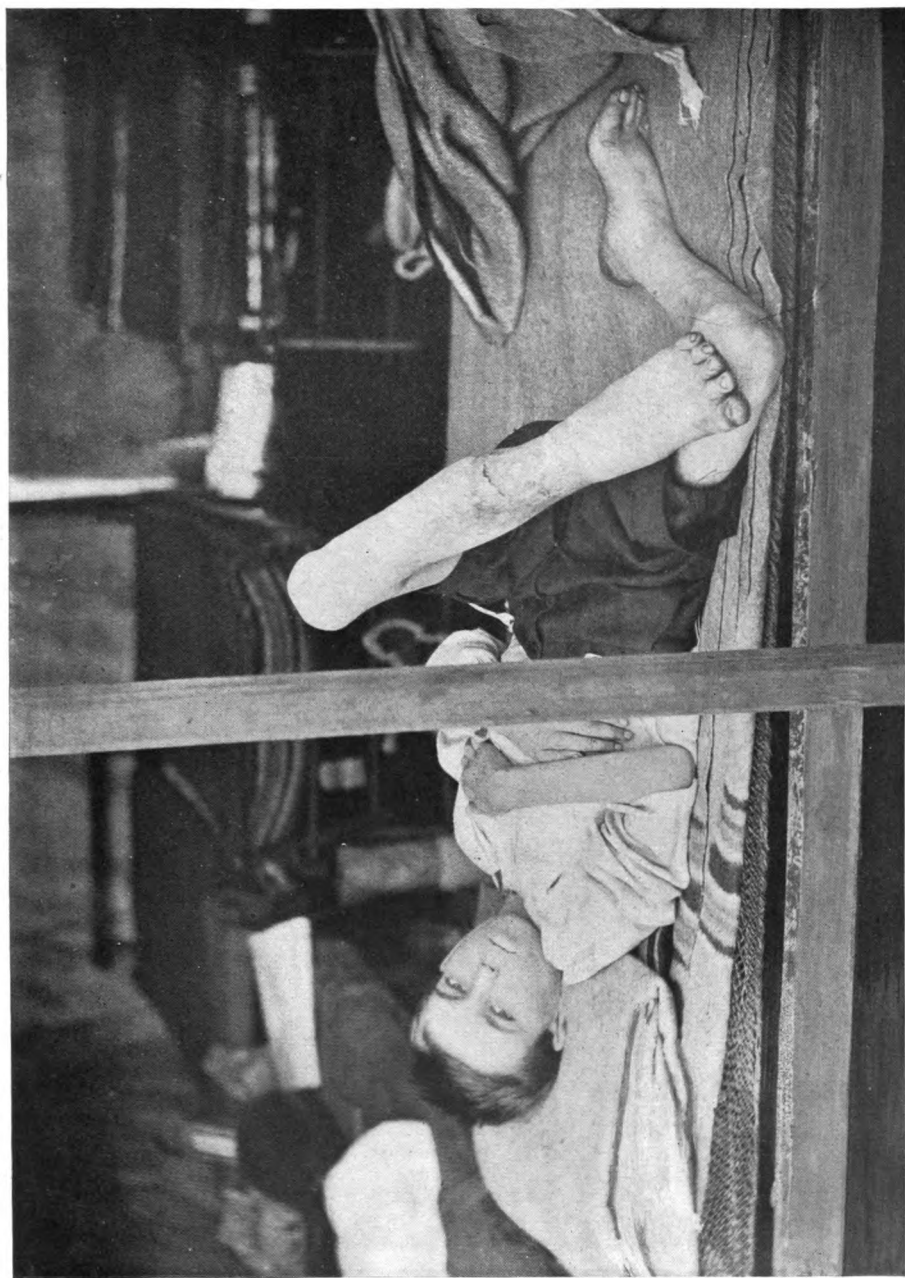


FIG. 7.—Selma Ellis, Cerro Gordo, Columbus County, N. C. Extreme case of hookworm disease; age 16, weight 62½ pounds; anæmic ulcer on leg; ill for 8 years. Photograph made at Fair Bluff, N. C., dispensary, July 29, 1911.



FIG. 8.—Selma Ellis seven weeks later. August 3 his hemoglobin was 14 per cent; red corpuscles 1,050,000; last parasites expelled September 9. On September 16 his hemoglobin was 55 per cent; red corpuscles 4,572,500; weight 79 pounds. Photograph September 16.



FIG. 9.—Selma Ellis, showing the anæmic ulcer healing. Photograph September 16. Compare with photograph of July 29.

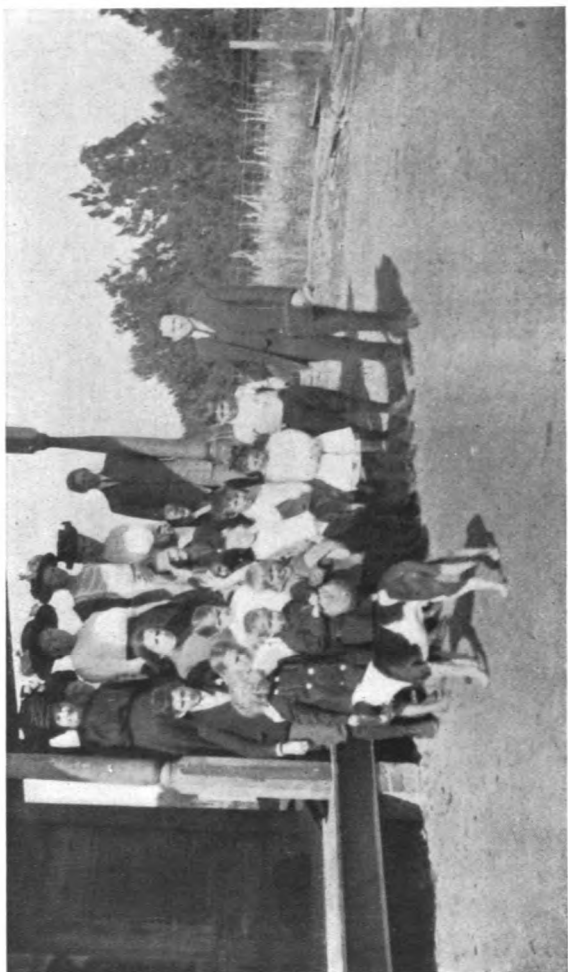


FIG. 10.—Dispensary group, Lowndes County, Ga., December 11, 1911.

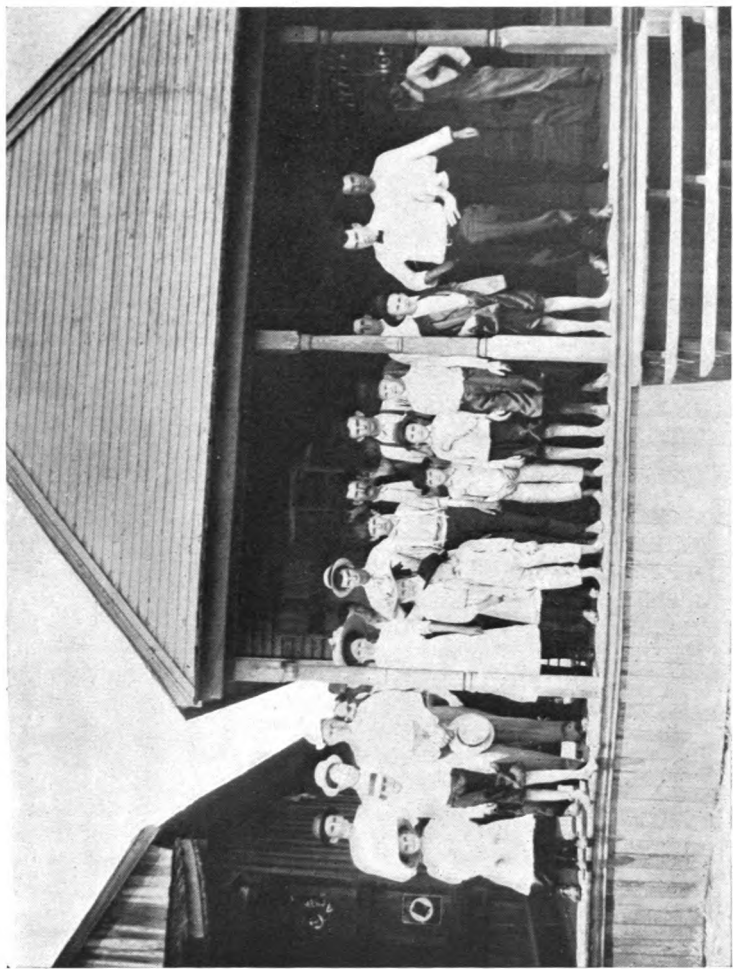


FIG. 11.—Waiting for the dispensary to open. Garland, Butler County, Ala.



FIG. 12.—Dispensary group, 10 miles from railroad, in Tishomingo County, Miss., December 12, 1911. Eighty-three persons treated at this dispensary on that day; some of them came 25 miles.



FIG. 13.—Dispensary group at public school building Fairmont, Robison County, N. C., July, 1911. Treated at this place on that day 187.

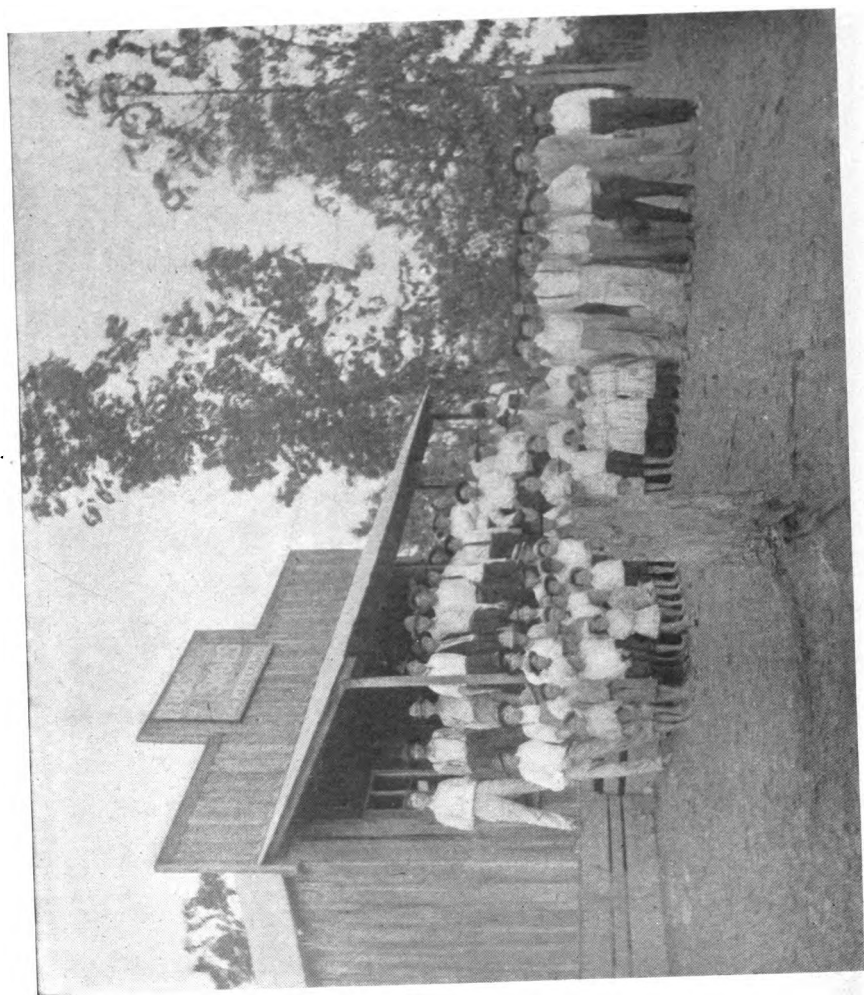


FIG. 14.—Dispensary group, Bienville Parish, La.

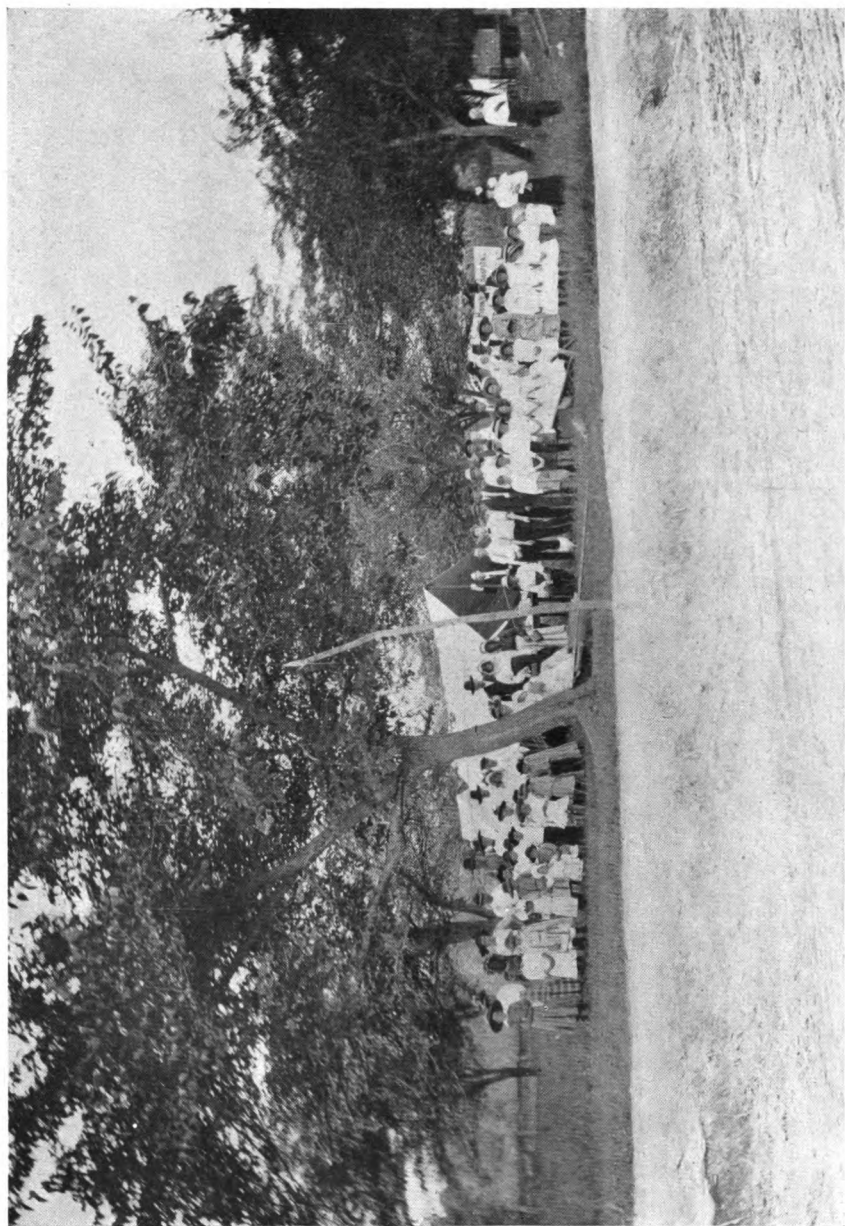


FIG. 15.—Tent hospital and dispensary, Jacksonville, N. C., September 6, 1911. Treated on that day 331.

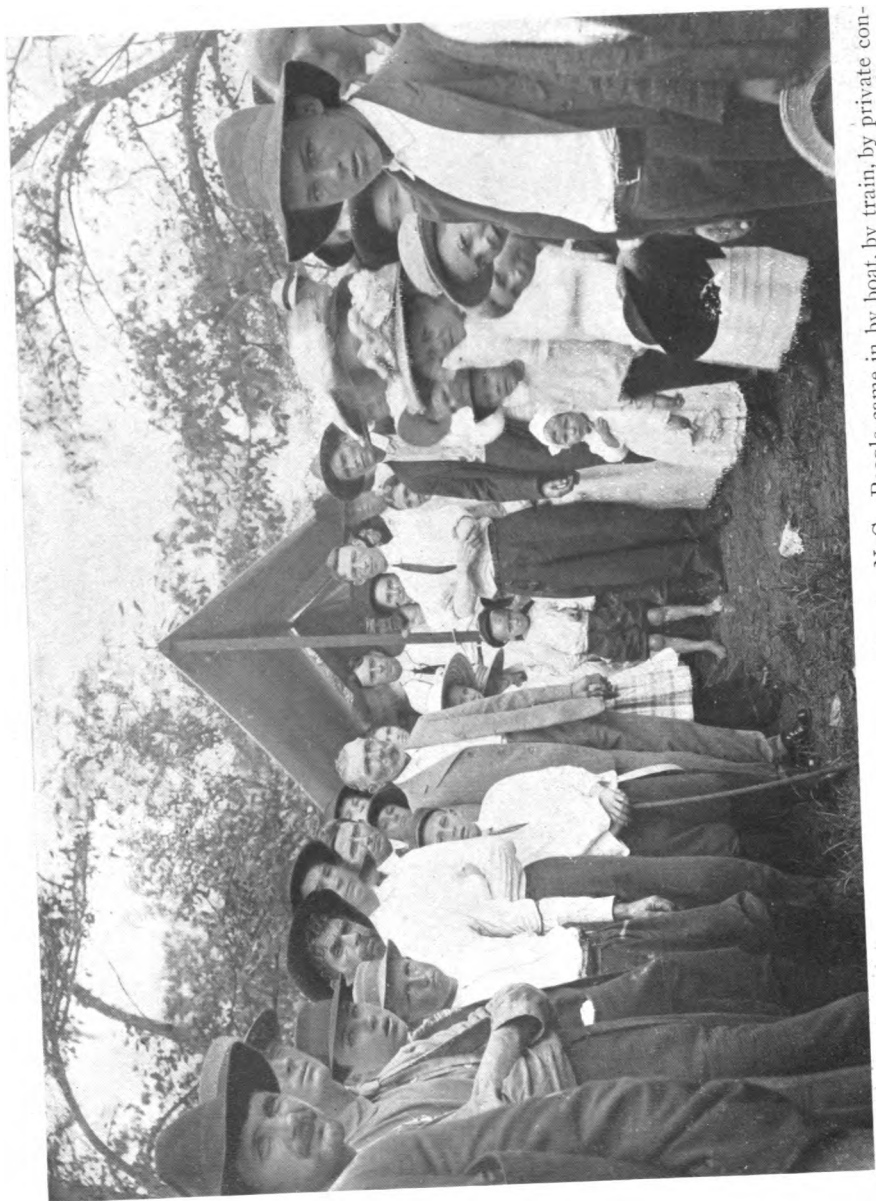


FIG. 16.—Dispensary group, Jacksonville, Onslow County, N. C. People came in by boat, by train, by private conveyance 20 and 30 miles.

3. Typical Record Forms and Letters.

No. 1. (*Sent to All Physicians in State.*)

HOOKWORM COMMISSION.

NORTH CAROLINA STATE BOARD OF HEALTH.

RALEIGH, N. C.,

DEAR DOCTOR: You will recall my previous requests for information concerning your experience in treating hookworm disease. The primary object of our campaign is to get sufferers treated by local physicians. We have no way of ascertaining what progress has been made except by obtaining information directly from the various physicians throughout the State. Practically all the State's physicians understanding the motive of our inquiry have cheerfully filled in and returned the blanks. Will you not kindly fill in as accurately as you can and return the enclosed blank *while your mind is on it?*

The campaign is progressing nicely. Already more than 35,000 people have been reported treated in the State by more than 600 North Carolina doctors; 1,306 doctors replied to the previous request for information; 600 doctors have been using the State Laboratory of Hygiene to have examinations made; 726 have distributed hookworm literature in their practice.

The State and county dispensaries for the free examination and treatment of hookworm disease, that have already operated in eight counties and have been provided for in six others, have afforded the most gratifying stimulus yet tried for arousing the people. After we have remained six weeks in a county and gone, the results of treatment having been made apparent in every direction, the people in many instances who previously seldom consulted physicians seek treatment from the regular practitioners.

A wholesale drug house reports a great increase in the sale of thymol among the doctors in the counties where the dispensaries have been. The physicians, county commissioners, and the public have been highly pleased with the results. Please fill in the enclosed blank and return, and help the cause in every way possible.

Very truly yours,

JNO. A. FERRELL,

Ass't Sec. for Hookworm Disease.

J. A. F./R.

No. 2. (*Blank Form Enclosed with Letter "No. 1."*)

JNO. A. FERRELL, M. D.,

Ass't Sec. for Hookworm Disease, Raleigh, N. C.

DEAR DOCTOR: I am herewith giving the answers to your questions as nearly correct as practical on short notice.

(Answers.)

Number of cases of hookworm disease I reported
having treated up to March 14, '11.
Number of cases of hookworm disease I have
since treated
Total number of cases of hookworm disease I
have treated
Number of the above cases who were negroes..

In order to acquaint my patrons with the disease and stimulate interest in the work, I shall be obliged if you will send to me for distribution the supplies indicated:

(Answers.)

Number of two-page leaflets on Hookworm Dis-
ease
Number of illustrated pamphlets on Hookworm
Disease
Number of illustrated bulletins, "Hookworm
Edition"

Number of illustrated leaflets on construction of
sanitary privies.....

Number of printed prescription pads, treatment
for Hookworm Disease.....

Very truly yours,

....., M. D.

.....Post Office.

.....County, N. C.

Date.....

NOTE.—In filling in this blank, a report or histories of one or two of your most interesting cases will be appreciated now or later. Quite a number were published in the December Bulletin.

No. 3. (*Sent to Head of Family in Which Microscopic Examination Has Demonstrated the Presence of Infection.*)

The report of, 191., of the specimens sent by you to the Virginia Department of Health, at Richmond, shows that

.....
is (are) suffering with hookworm disease.....
.....

This is a serious matter, and if neglected these worms, by constantly feeding on the patient's blood, will cause it to become thin and watery and the person to become pale, weak, and, if a child, stunted in the growth of both body and mind.

School children with this disease make poor progress in their studies, and may be expected to stand low in their classes.

The disease can be easily cured with two or more treatments, a week apart, each treatment lasting only one day.

When freed from the worms, the task is not complete till you adopt measures to prevent future infection.

This consists in providing a sanitary privy at home and seeing that every member of the family uses it at all times. See also that children are properly protected at school, and that the trustees comply with the law requiring them to build two privies for each school-house.

You thus prevent infection of the soil with hookworm eggs, which soon hatch into small worms ready to enter the body through the bare feet of all who visit such places, especially in wet weather.

This produces ground-itch, which is the beginning of hookworm disease.

I wish to assure you of my deep interest in this case, and that you are at liberty to call upon me freely for advice or further aid in connection with it.

Do not fail to report final result.

I beg that you lend me your aid in inducing others to be examined and treated, and to adopt proper sanitary precautions.

Yours very sincerely,

.....

No. 4.

ALABAMA STATE BOARD OF HEALTH.

To the Board of County Commissioners of Dale County.

GENTLEMEN: This will introduce to you Dr. H. G. Perry, representative of State Board of Health of Alabama. He is in our county in the interest of the campaign for the eradication of hookworm disease. The plans as outlined by him seem to be feasible and in my opinion will be of great benefit to our people.

The request for an appropriation by your court of one hundred and fifty dollars (\$150.00) seems reasonable and will meet with my approval. This money will be used for the purpose of distributing literature concerning the disease and the campaign among the people, and to pay for the medicine used. The State Board of Health will furnish Dr. Perry to conduct the free dispensaries without further cost to us. In order to facilitate matters it is necessary for the money to be available at once.

I therefore suggest that you sign the agreement below so that this end can be accomplished.

Respectfully,

C. A. B. EDWARDS,
Probate Judge.

No. 5.

APRIL 27, 1911.

To the Honorable Court of County Commissioners, Dallas County, Ala.

GENTLEMEN: We, the undersigned committee from the Dallas County Board of Health, respectfully request your body to appropriate the sum of two hundred and fifty dollars to defray the expense of advertising and medicines for the campaign for the eradication of hookworm disease in Dallas county.

This is a movement of great importance from a public-health standpoint. We feel that no other expenditure of public funds will result in more good to the people.

Respectfully,

W. W. HARPER, M. D.,
T. G. HOWARD, M. D.,
S. G. GAY, M. D.,
Committee.

No. 6.

ALABAMA STATE BOARD OF HEALTH.

We, the undersigned members of the medical profession of Dale county, have decided that the establishment of a chain of dispensaries for the free treatment of all cases of hook-worm disease will be the most effective way to bring these patients to treatment. This is a movement which will be of the greatest public good, and as citizens and as conservators of the public health we give the dispensary plan our endorsement and pledge ourselves to its support. It is understood that the Court of County Commissioners will be asked to bear the local expenses of advertising and medicine, and that the State Board of Health will furnish a competent physician to conduct the dispensaries until April 1 at least, provided the number of patients applying for treatment will justify.

(Signed)

S. M. C. HOWELL.

J. E. STOKES.

CURTIS ESPEY.

M. O. GRACE.

R. G. CARY.

H. D. REYNOLDS, JR.

A. F. TOWNSEND.

W. L. HOLMON.

C. R. ATHOY.

J. L. REYNOLDS.

A. L. TOWNSEND.

W. D. MIXON.

J. H. PATTON.

F. B. CULLENS.

E. B. ARD.

No. 7.

To the County Commissioners of Lowndes County:

We, the undersigned members of the Board of Education of Lowndes county, express to the Georgia State Board of Health, through their Department of Field Sanitation, our ap-

preciation of their work toward the eradication of hookworm disease in the schools of our county.

The results of the work done by the State Board of Health have shown that there is a heavy infection of hookworm disease in our rural schools.

We realize that this disease, by retarding the development, both mental and physical, of the school child, is each year causing a large part of our educational efforts to be wasted.

We also realize that either through poverty or indifference the great majority of these sufferers are not being reached by the present methods.

In view of these facts, and also in view of the excellent results accomplished by use of the plan in other Southern States, we are convinced that the only feasible plan whereby the great mass of these children will receive treatment is the plan of *free dispensaries*—field hospitals for the treatment of hookworm disease.

Therefore we do earnestly pray the County Commissioners of Lowndes county to appropriate whatever funds may be necessary to assist the Georgia State Board of Health in the inauguration of the dispensary plan in Lowndes county.

(Signed)

E. P. S. DENMARK, *Chairman;*

J. G. CRAWFORD,

J. C. KING,

W. H. MCKINNON,

County Board of Education.

No. 8. (*Agreement Signed to Avoid Having to Wait for Regular Meeting of Commissioners' Court.*)

We, the undersigned members of the Commissioners' Court of Dale county, agree that at our next meeting we will appro-

priate the sum of one hundred and fifty dollars (\$150.00) to pay the local expenses of the campaign for the eradication of hookworm disease.

The money is to be placed in bank to the order of Dr. M. O. Grace, and the balance remaining after the bills are paid is to be returned to the county treasurer.

(Signed)

C. A. B. EDWARDS.

A. H. BORLAND.

T. F. WINDHAM.

A. N. FAIN.

No. 9.

STATE OF GEORGIA,

County of Lowndes:

We, the Commissioners of Roads and Revenues of Lowndes county, Georgia, realizing that hookworm disease is an infectious disease and dependent on faulty sanitation, and is a great menace to our county, and realizing that the majority of those suffering from this disease are not being reached by the plans now in vogue, and believing that the best method of reaching the great masses of those suffering is by coöperation with the Department of Field Sanitation of the Georgia State Board of Health in ridding the county of sources of infection by cure of the infected, and by teaching other proper sanitation, do hereby appropriate one hundred and fifty dollars to be used by this department of the State Board of Health in taking the steps necessary by proper means of, so far as possible, accomplishing the eradication, preventing the generation and spread of this infectious disease. Work to be pursued for six weeks from date, or as early thereafter as practicable.

(Signed)

J. P. COFFEE, *Chairman.*

November 6, 1911.

No. 10. (*Sent to Leading Citizens.*)

HOOKWORM COMMISSION.

NORTH CAROLINA STATE BOARD OF HEALTH.

GREENVILLE, N. C., *October 17, 1911.*

DEAR SIR: You are aware no doubt that your county has made provision to have State and county free dispensaries for the examination and treatment of hookworm disease, and that the work has been very successfully carried on in eight counties, is now in progress in five counties, including your own, and has been provided for in six other counties, making a total of nineteen counties.

The success in the eight counties worked was due in a large measure to the active coöperation secured from the most influential citizens of the best and most thickly settled communities. In less than thirty days 12,500 treatments were dispensed by four physicians in four counties.

With your influence in your section of the county you can render a lasting service to your people by setting an example in visiting the dispensary and taking your family. What you do the masses will do, and consequently on you and others of your position depends the success of the effort to bring health, happiness, and usefulness to those who, though diseased, have not the courage to take the lead in obtaining the free treatment they need.

Leading men in all the other counties in which we have been saw and took advantage of the opportunity to help their people. We believe you will likewise seize the opportunity and work actively in every way possible to arouse the people and get them out to the dispensary.

Inclosed you will find a hand-bill giving the dates and places of the dispensaries.

Kindly have the Sunday School superintendent and the minister and the school teachers to make announcements about the dispensaries and urge the people to visit them.

Assuring you we shall greatly appreciate your coming out to the place nearest to you and getting as many others as possible to come, I am,

Very truly yours,

Director in Charge.

No. 11. (*Sent to All Ministers in the County.*)

To the Ministers of Winston County:

On the first day of January there will be inaugurated in Winston county a chain of dispensaries for the free treatment of hookworm disease, and in connection practical suggestions will be offered for the improvement of local sanitary conditions.

Realizing that the children of this county are suffering from the effects of this devitalizing parasite and that it is draining from its poor victims the youth and vitality which it is their inalienable right to possess, we ask that the preachers of the various churches lend their influence and promise their hearty coöperation.

We suggest that on the remaining Sundays between now and that time announcement be made from the pulpit relative to this work, and that you exert every influence to impress upon the individual his duty in caring for the health of his children.

(Signed)

S. B. MYERS,
Methodist Pastor.

G. S. JENKINS,
Baptist Pastor.

A. J. CRAWFORD,
Presbyterian Pastor.

No. 12. (*Typical Dodger Used to Give Publicity to the Dispensaries.*)

NOTICE!

The State Board of Health, acting with Columbus County will open a field hospital for the treatment of HOOKWORM and other such diseases, at the following places in the county, on the dates named below:

Chadbourn, July 10th to 16th.

Whiteville, July 17th to 23rd.

Fair Bluff, July 24th to 30th.

Tabor, August 1st to 7th.

Lake Waccamaw, August 6th to 14th.

Freeman, August 14th to 21st.

There will be two wards in this hospital, one for males and one for females. A physician from the State Board of Health will be in charge of the hospital and an expert from the State Laboratory of Hygiene will be present to do the microscopic work.

A lady chaperone will be in charge of the female ward and every courtesy and attention will be given all persons, rich or poor.

There will be illustrated lectures and demonstrations on sanitation daily. These will be in plain simple terms that any one can understand and any one can also see the workings of that wonderful instrument, the microscope, by simply asking the man in charge. We want every man, woman and child to be examined while the hospital is in his or her section.

Many of the bad feelings people have, are due to hookworm and we have found that about half of the people are infected.

**This is Absolutely FREE---The State and County
Are Paying For It.**

So many people have been found infected and the results are so certain and so wonderful that the County and the State feel that it is worth dollars and cents to them to restore so many of their people to health and strength.

Come out on the dates named and see what is being done. Don't think it is the other fellow who needs this. It may be you. Bring a small bit of your bowel movement with you to be examined with the microscope. It may be worth many dollars or may be life itself to you or your child. You will have only this one chance for free treatment.

Respectfully,

DR. C. L. PRIDGEN, State Board of Health.

No. 13. (*Printed on Back of Envelope in Which the Drug is Dispensed; Literature on Sanitation is Given Out With This.*)

DIRECTIONS FOR TAKING HOOKWORM TREATMENT.

1. Eat no supper the night before taking the medicine.
Take a dose of fresh salts at bedtime.
2. Next morning, take one dose of worm medicine at 6, the other at 8 o'clock.
3. Take a dose of salts at 11 o'clock and stay in the house until it acts.
4. When this has acted, you may eat anything not greasy or oily.
5. If you get weak, drink some strong plain coffee.
6. Strain passage through cheese cloth, pouring on fresh water until everything is washed through. The worms will be left on the cloth. Put them in a bottle of clear water and bring them with you next time.
7. It may take more than one treatment to get all the worms.
8. Do not get infected again. It is your duty to keep your family well.
9. Come back next week.

No. 14. (*Letter Covering Report to County Authorities at the Close of the Dispensary Work.*)

To the Honorable Board of Commissioners of Pitt County.

GENTLEMEN: I have the honor to transmit herewith a report covering the work done during our 45-day hookworm campaign in your county.

The attached report is self-explanatory. Total cost to Pitt county, \$302.08.

You will note that we examined 4,526 people (old and young), and found 2,333 infected with hookworm disease, to which number we gave a total of 4,033 treatments.

I am pleased to advise you that many hundreds of your good people have been relieved of this devitalizing disease and taught how to prevent its recurrence.

I wish to thank you gentlemen for your coöperation and for the many favors granted me during my labor in your county. I wish to say furthermore that such has been the courtesy and hospitality of your people that I leave Pitt county with reluctance.

Respectfully submitted,

.....,

Physician in Charge.

No. 15. (Typical Tabular Statement of Work in a County.)
REPORT OF PITT COUNTY DISPENSARY WORK—45 DAYS.

Location of dispensary.	Examinations.		Total No. examined.	Treatments.			No. persons treated.	Total No. treatments.		
	Micro.	Clin.		1st.	2nd.	3rd.				
Grifton	276	213	11	37	130	116	120	13	379	774
Greenville	370	451	178	90	243	125	141	4	513	932
Bethel	209	227	11	5	67	75	64	3	209	421
Farmville	129	133	95	53	99	63	54	3	219	399
Grimesland	128	71	8	...	83	38	16	..	137	207
Ayden	260	388	4	...	167	81	15	..	264	374
Winterville	253	263	7	...	138	89	33	..	260	415
Pactolus	39	38	1	...	29	6	5	..	40	50
Stokes	113	59	4	...	74	38	6	..	118	168
Falkland	183	107	11	...	123	49	22	..	194	287
Totals	1960	1951	430	185	1,153	680	476	23	2,333	4,033
Other parasites found:										
Ascaris				134	Literature distributed:					
Hymenolepis				14	Hookworm pamphlets					
					leaflets					
					Sanitary privy					
					Malarial fever					
					Typhoid fever					
					Posters					
					Circular letters					
Lectures:										
To schools				6	Attendance.					
To dispensary visitors....				78	787					
				84	3,898					
Visitors to dispensaries.....				84	4,685					
					7,152					
					15,492					

No. 16. (*Sent to All Papers of State.*)

SEVENTY-TWO HUNDRED PEOPLE TREATED FOR HOOKWORM
DISEASE IN TWENTY DAYS IN FOUR COUNTIES.

In the counties of Sampson, Robeson, Columbus, and Halifax 7,260 victims of hookworm disease have been treated at the State and county dispensaries. Nearly double this number have been examined. During the first five days the dispensaries were open only 615 cases were treated, whereas during the last five days 2,808 were treated. During the twenty days there were treated in Sampson 1,682 cases; in Robeson, 1,352; in Columbus, 3,047; and in Halifax in twelve days, 1,169 cases.

The county boards of education to show their spirit of co-operation, are having sanitary privies installed at all the school-houses being used as dispensaries.

After about two weeks the dispensary work will move into new counties. Cumberland, Onslow, Wayne, and Northampton counties have made the necessary provision to have the dispensaries next. The Commissioners and people generally are highly pleased with the work of the dispensaries.

DEAR EDITOR: Above I am sending a news item concerning the State and county dispensaries. Kindly use it in your next issue.

Very truly yours,

JNO. A. FERRELL,

Ass't Sec. for Hookworm Disease.

J. A. F./B. C.

August 12, 1911.

[illegible]

No. 18.

TO NORTH CAROLINA BOARD OF HEALTH.

Report of Dr. _____ District Director Sanitation.

Town _____ County _____ Sanitary District No. _____

Sheet No. _____ Date _____

HOOKWORM DISEASE

INSPECTIONS

	WHITE.					NEGRO.				
	Name or Location.	Attend- ance.	Sus- pects.	Micro.		Name or Location.	Attend- ance.	Sus- pects.	Micro.	
				+	-				+	-
SCHOOL Ages 6 and 16 Inclusive.										
GENERAL Ages 6 and 16 Inclusive.										

PERMANENT SURVEY

	WHITE.					NEGRO.				
	Where Selected.	Number.		Com- munity Type.	Type Privy.	Where Selected.	Number.		Com- munity Type.	Type Privy.
		Census.	Exam.				Census.	Exam.		
INFECTION, Ages 6 and 16 Inclusive.										

No. 19. (*Sent to All Newspapers in State.*)

HOOKEWORM COMMISSION.

NORTH CAROLINA STATE BOARD OF HEALTH.

Hookworm Treated Free at the State Fair.

People visiting the State Fair will have an opportunity to know just what a hookworm dispensary is, as there will be at the fair a model dispensary. Hookworm victims, hookworms, and hookworm eggs will be on exhibition. A physician will make free examinations, and, to all who are infected, administer free treatment. Laboratory men will be there with the microscopes and make microscopic examinations for all who present specimens for examination.

As nineteen eastern counties have already made provision for these dispensaries for the free treatment of all the people who are infected, and inasmuch as a large number of other counties are seriously considering opening the dispensaries, it will be a matter of great interest to the substantial men and women attending the fair to see just how the work is carried on.

In addition to the exhibits, stereopticon illustrations will be thrown on a screen from time to time during the day and explained by a lecturer. As this kind of an exhibit will be something of an innovation, doubtless it will attract a good deal of attention.

DEAR EDITOR: Special news article. Please publish.

Very truly yours,

JOHN A. FERRELL.

4. Typical Letters Exhibiting the Work from Different Angles of Vision.

(1) *A Physician's Diagnosis of His Own Case.*—Since my experience with hookworm disease has been unique, I take pleasure in giving you a rather detailed account of how it served me. In the fall of 1907 I noted that I was unable to do as much work as I had done before; the only symptom was a feeling of lassitude. My appetite was good, and, with the exception of a disinclination for work, I was in very good condition. This continued until January, 1908, when I gave completely out and had to take a rest. After one month spent in the country I was able to resume work again. After two months' work I noticed that my feeling of lassitude was coming back again, and added to this I began to suffer with indigestion. I suffered with pain in the right hypogastric region; at times it would be intense. Pressure over the region of the gall bladder was intensely painful most of the time. I realized that some serious trouble was brewing in that neighborhood and consulted my friends in north Louisiana. They palpated the region; they asked me all the questions a man must answer; they figured on every possibility, and at last decided that so much suspicion was directed to my appendix that it must come out. In June, 1908, I was operated on for appendicitis. Apparently my symptoms gave way for awhile; but within a few weeks the old pain returned, and my inability to handle food rendered my life almost intolerable. In October, 1908, I gave up work again for 30 days, returning to work in November, and after two weeks I completely collapsed. During 1908 my condition would improve, then get worse, and so I passed the year merely living, doing

what work I could best handle without much effort. From time to time I was examined by our best men in north Louisiana, several of whom wanted to drain my gall bladder. I found considerable relief in salol and castor oil, taking about three doses a day. This gave me more relief than anything else. I was unable during this time to handle any type of food except the very lightest and most easily digested, going for days on two or three glasses of milk, and that diluted. During 1910 the story of 1909 is repeated, except that I had about decided that no one knew my trouble; and, as I could neither die nor get well, and my condition had hung fire over a period of two and one-half years, I had begun to catch at straws. In January, 1911, I developed a jaundice that lasted two weeks, my other symptoms remaining the same. When the health train came through my town, Dr. Cary examined me for "hook worms" and found that I was heavily infected. I took the treatment that night, and my improvement from that day to this has been to me phenomenal. The first month I gained 10 pounds. I could eat all types of food that other people eat; my appendicitis was well; the gall-bladder symptoms disappeared; I felt like a new man with new aspirations and renewed energy. I have made investments in real estate, as well as other things, and some of them have given good results; if I could have invested one thousand dollars (\$1,000) in two doses of thymol two years ago, it would have been the greatest investment of my life. The loss to me during this time in being unable to handle properly my practice has been more than double this amount. I have treated many cases of hookworm disease. I have seen the roses come back to the cheeks and color to the lips of children and adults; I have seen them go back to work with renewed energy and brighter

hopes. During this time it never occurred to me that I was harboring those same little parasites. My friends who worked so diligently to discover the cause of my trouble were just as much shocked as myself to know the cause that kept me down during this time. You may rest assured that I am enthusiastic, and that I will render all aid in my power to assist you in the campaign.

J. M. MOSELEY, M. D.

Arcadia, La., May 31, 1911.

Dr. S. D. Porter, New Orleans, La.

(2) *A Father Sees the Treatment of His Own Son in Terms of Dollars and Cents.*—The case in point was seen at the dispensary held in Chadbourn, Columbus county, and served to bring many others in to us. The boy was about fifteen years of age when seen. His father had heard his neighbors speak of the work that we were doing and had read the pamphlets and dodgers that we had sent out. His curiosity was aroused, and when he heard the results of the treatment given to two other boys in similar condition to his son, he determined to bring his boy to see me. The boy was a typical subject. His skin had cadaverous appearance, the membranes were almost white, and there was extreme lassitude and apathy. He seemed to take no notice of the crowd or the exhibits on display, and submitted himself to a physical examination with the most profound indifference. When the examination was completed he at once turned, without waiting to hear the diagnosis, and went to a log near by and sat down, apparently very fatigued.

There were so many similar cases in the great crowd that pressed upon me that no further attention was given the boy except to caution the father as to treatment, explaining that

I was giving him a small dosage and asking him to return for a second treatment, and to let me know how the boy progressed. The case was forgotten until at a later dispensary the father came back to see me to pour out his thanks and tell me of the wonderful improvement. He said that the boy had always been of no account, worthless, trifling. He said that he regarded it as a case of laziness and worthlessness. He said that the boy would lie on the porch like a dog, day after day apathetic. He could not be aroused to either work or play. The father said he could not believe that it was sickness, because whenever the bell for meals rang the boy was up, the first at the table and the last to leave, and ate more than the farm-hand.

The boy responded at once to the treatment and picked up vitality in a remarkable way. He began to take interest in many things and to help with the work. The economic value of this treatment can be best presented just as the old farmer told it to me. "Aside from saving my boy," said he, "this thing means money in my pocket. Before I saw you I had to feed and clothe him and care for him at a dead expense, and with no hope that it would ever be different. I had to hire a man to take the work I had counted on his doing, which cost me \$1 a day. Now I have figured this thing out this way: I am not only saved the dead expense of his doctor's bills and medicine, and all that, but I am saved the price of the hand which I have discharged, which is \$1 a day, not for a day or two, not for one or two years, but for many years, until he is grown and leaves me to make his own way in the world. I consider," he said, "that this is the darnedest best investment I ever made." And he began pouring out his thanks again. "When I left home," he said, "that boy was following a plow

and yelling at the mule in a way to let you know that he was just glad to be living."

C. L. PRIDGEN, M. D.

(3) *Scientific Notes on a Stretcher Case.*—Selma Ellis was taken into Dr. Pridgen's field hospital for a few days; then he was sent to the Marine Hospital, Wilmington, N. C., August 3, 1911, on a stretcher. Age, 16; height, 4 feet 7½ inches; weight, 62½ pounds. Face puffy and bloated; legs and ankles very much swollen; scrotum and prepuce very edematous and painful. Tibial ulcer on left leg, which had continued for eight years; oval in shape; size, 4½ by 2½ inches. Blood examination: red-blood cells, 1,050,000; hemoglobin, 14 per cent. Throbbing of entire chest and neck at each pulsation. Remained in the hospital six weeks; took five treatments; passed 605 worms, and was completely cured of the infection. Practically all swelling and edema had disappeared. Discharged September 18. Red-blood cells, 4,512,500; hemoglobin, 55 per cent; weight, 79 pounds—a gain of 16¾ pounds, in addition to the enormous amount of fluid lost from the system. Ulcer on leg, 2¼ by 1⅛ inches; cervical and precordial pulsations much diminished; appetite and digestion good. When dismissed from the hospital was able to run around and go wherever he chose.

Selma has always been too sick to attend school, although there is a public school only a few hundred feet away from his house. He is now attending school for the first year in his life.

C. W. STILES.

December 15, 1911.

(4) *Exhibiting the Work of a Practicing Physician and His Joy in the Service.*—My son and I established a free dispensary service (furnishing our time and money) during the second week in last July for the benefit of hookworm victims. Since then we have given free treatment to at least 350 persons, ranging in age from two to sixty-five years. For the benefit of the workers we give each Sunday morning. By so doing we do not take them away from their labor. One Sunday we had forty-one at our Sunday school, and every one of them had hookworms.

I never invested a little money in anything that has ever given me half the pleasure I have gotten out of our hookworm crusade. There has been a remarkable increase in the intelligence of these people; rosy cheeks and bright eyes have taken the place of pallor and leaden eyes.

It just does me good all over to look at these boys and girls and see how happy and bright they look. Many of them are going to be fine citizens some day.

H. O. HYATT, M. D.

Kinston, N. C., March 30, 1911.

Dr. Jno. A. Ferrell, Secretary Hookworm Commission,
Raleigh, N. C.

(5) *School Officials See the Work in Educational Terms.*—Ninety-nine per cent of our school children have been examined; 85 per cent of them were infected; 30 per cent were heavily infected. As a result of your treatment for hookworm in our school, we find that children who were ranking fifth and sixth in their classes now rank second and third. Their lessons are not so hard for them; they pay better attention in class and they have more energy. These children have gained from 4 to 18 per cent of their actual weight. In short,

we have here in our school-rooms today about 120 bright, rosy-faced children, whereas had you not been sent here to treat them we would have had that many pale-faced, stupid children. We are indeed grateful to you, Dr. Adams, for the earnest effort you put forth to eradicate hookworm disease from our community, and trust that you will continue to fight it until it is entirely exterminated.

W. E. MOORE, *Principal.*

F. R. CORKERN, *Assistant.*

R. W. MAGEE,

W. R. SEAL,

Board of Directors.

Varnado, La., November 30, 1911.

Dr. George B. Adams, Franklinton, La.

(6) *Exhibiting the Work as Seen in One Community.*—On Thursday, June 15, I met Dr. Fisher by appointment at Fredericksburg to make a journey with him through the Northern Neck in order to see the results of our work in this territory, where the field work first opened about fourteen months ago. The "Northern Neck" is the neck of land lying between the Rappahannock and Potomac rivers and includes the counties of King George, Westmoreland, Richmond, Northumberland, and Lancaster. This territory constitutes Sanitary District No. 1 in Virginia and has been assigned to Dr. A. C. Fisher.

From Fredericksburg we went by boat down the Rappahannock River for about 80 miles to Sharps; from Sharps we drove six miles to Emmerton, Dr. Fisher's home. From this point we made a number of excursions on Friday and Saturday into the surrounding country.

Dr. Fisher is the oldest man in the service; a Scotchman by descent, with the energy, the tenacity, the hard common sense that belong to the blood. He was born on the Northern Neck; has been a country doctor here for more than twenty-five years; knows almost every man, woman, and child, black and white, in four counties, and commands the confidence and esteem of his people.

When Dr. Fisher took up his work on April 1, 1910, the infection in this district was heavy, as was shown by the first survey of Richmond county. Dr. Fisher selected one public school at random in each district in the county, secured specimens from every child in each of these schools, and had these examined at the laboratory. Records were made by schools. The results showed an average infection of 82.6 per cent for all schools examined. This result, being based on an examination of children in school, was taken as a conservative estimate of the average infection for the school population of the county.

The infection was found to be very unevenly distributed; some areas are comparatively free, while pockets of infection were found where practically every person was suffering from the disease. This sharp contrast between heavily infected communities and communities practically free from infection affords the most striking illustration that I have seen of the physical, intellectual, moral, social, and economic results of hookworm disease on a community.

Such a contrast we saw near Dr. Fisher's home. Lying a few miles northeast from Emmerton in Richmond county and extending over the border into Northumberland and Westmoreland counties is a large scope of country which for generations has been inhabited by a people set apart by marked

peculiarities from the people surrounding them on every side. The people are called "Forkemites," the term deriving from the fact that the nucleus of the community lies in the wide-spreading fork of a tidewater creek; and for generations the name has been a by-word. Lack of energy and thrift has brought to the Forkemites extreme poverty with the inevitable mental and moral results.

A few examples of what I saw in this community will give you some conception of the conditions and of what is being done to improve them. Dr. Fisher took me to see the Totus Key school, located in the heart of this community. When this school was examined, little more than a year ago, there were 40 children attending it. It was known as a hard school, and could not keep its teachers. Examination showed that of the 40 children, 38 were infected; the other 2 were children that had come in from the outside. But these 38 infected children in the school represented the lighter infections of the families to which they belonged; there were belonging to the school 45 other children who were not attending and who had never attended school. These 38 children have been treated—most of them by Dr. Fisher himself; most of the other 45 have been treated. Henry Thrift, of Village, Va., the teacher who had charge of the school when the examination was made, has it now and will return to it next year. He told me in simple words an appealing story of how the treatment of these children had transformed the school. Children who were listless and dull are now active and alert; children who could not study a year ago are not only studying now, but are finding joy in learning. These children were born of anemic parents; were themselves infected in infancy; for the first time in their lives their cheeks show the glow of health. With this has

come a new light to the eye, a new spring to the step, a new outlook on life. All this shows itself in a new spirit in the school.

Some of the 45 children who had never attended school, having been treated, have come in during the year. Others have declared their intention to enter in the fall. At this school I was shown two sanitary privies, just recently built by the school board. Similar ones I saw at other schools in the county. Every school in Dr. Fisher's territory is to be supplied before school opens in the fall.

Dr. Fisher took me to see a large number of persons and families in the neighborhood of this school. Within a few minutes after Henry Thrift had given us the story of the school, we stopped by the fence where we saw a young man plowing corn. In reply to his greeting as he came to the end of his row, Dr. Fisher called out: "Hello, Willie. Where did you get that smile? I never saw it before." "Oh," he said, "I'm all right now. I'm workin' every day and feelin' fine." This was William King, age 26. One year ago he was in bed and had been given up to die; he had chronic sores on his legs up to his knees, and hadn't good blood enough to cure them up; he had all his life been an anemic, illiterate and thriftless. He was found heavily infected; was treated a few months ago; is well now, married a few weeks ago; is making a crop and in his own words is "workin' every day and feelin' fine."

Near this farm we stopped at the house of Richard Prescott. Mrs. Prescott was hoeing in the garden. She came to the fence and at Dr. Fisher's request told me the family story. She had been an anemic since she could remember; had never until this year known a well day; had borne six children; one of them had died of hookworm disease, or "dropsy," as they

thought at the time; had been confined to her bed much of the time; the whole family was ill, the father being able to do about half work and the elder boy doing almost none. There stands the little one-room hut in which the six children were born and in which the family lived. Dr. Fisher found them all severely infected. He told me he had not seen a more wretched-looking creature than this woman. He treated them about a year ago. Since then they have all been working that were big enough to work. There is the new house nearing completion; the lumber for a sanitary privy is on the ground; the older boy was plowing corn near by. I talked with him; he has good color; is alert; the mother says he is going to enter school in the fall. No member of the family has ever been in a school. The family is on its feet; the mother's first thought is of a better life for the children.

Just across the road from this family lives a Mr. Sydnor with his wife and six children. Two of the children had died of anemia; all the others were ill; those that were large enough to work could do only half work; none had attended school; the whole family was heavily infected; the struggle against poverty, ill-health, and growing doctors' bills for services that brought no relief had been hopeless. In this condition Dr. Fisher had found them, had given them treatment, had brought them to their feet, and sent them to their work; all are well now save the youngest child, that needs an additional treatment; and it came as a gift from heaven—there had been no bills to pay. And as the old mother came to the end of her story and tried to express her gratitude, she faltered, then referred to what is being done also for others; and raising her hand she said, "It is the greatest thing that ever come."

A short drive down the same road brought us to a country cross-roads called Haynesville, where W. R. Davis keeps a store. We stopped in front of the store and called him out. He is a fine physical specimen, with plenty of red blood and a keen native intelligence. He was born in this community; like practically every other child born in this pocket, was infected; as a boy he left the community and the State, and in course of time threw off the handicap by natural processes; developed a strong body and a keen wit; prospered; married; returned to his old home to become a country merchant and a leader among his people. There he stands as a measuring rod to indicate the weight of the handicap by which the rest of the community has been held back in the race. He has five children now. When Dr. Fisher took up his work he found all these children infected. The father had them treated at once; saw what it meant, and became Dr. Fisher's most active ally in getting his neighbors interested. "It means much to my business," he said. "This soil around here is as fertile as any soil in Richmond county, but the farms, as you see, are not productive simply because the people have not been able to work them properly." All this I had seen and commented upon when we first crossed the line which marks off this community as a thing apart. There is the same fertile soil which gives the Northern Neck all the possibilities of a garden plot; but the farms are not productive; the houses, the gardens, the fences show neglect; the whole countryside looks frayed out; poverty and neglect are written upon the face of the people and of the land. "The people have not been able to buy at the store more than the barest necessities," continued Mr. Davis; "but already the change is coming. Almost everybody around here has been treated; all who are old

enough to work are earning something; they are feeling hopeful and buying more things."

Pointing to a farm-house across the way, he said to Dr. Fisher: "A child was born over there last night." Then Dr. Fisher told me the story. Ten years ago he was called to see this woman in the case of her first labor; he found her extremely dropsical, the tissues being so distended and watery that they could not stand the strain; the result was frightful. The woman was sent to Baltimore for surgical treatment. She was kept in the hospital for some weeks, and was sent home as a hopeless case, to die of "kidney trouble." But she did not die. And when Dr. Fisher had treated the Davis children, about a year ago, she sent for him; he found her heavily infected; gave her treatment, which cured completely and in a few days, the disease which had baffled him and the Baltimore physicians ten years ago and had made her an invalid for all these years. The second child had been born the night before.

And so the story might run on indefinitely. Dr. Fisher can tell you of cases like these all day long and show you the people. I should like to give the story of a family or two to illustrate the moral effects of the disease; but the details are better omitted. The fact is we have here a large community in which practically the whole population has for generations borne the burden of a heavy infection; the community has been islanded and this isolation has been both cause and effect in accentuating the cumulative results—physical, intellectual, economic, and moral—which have been handed down from one generation to the next; from generation to generation there has been a lowering of physical vitality; this in turn has brought a lowering of mental vitality; the struggle for exist-

ence has grown more hard and hopeless; one result has been a deadening of the moral sense and a loss of self-respect, which shows itself in the moral tone of the community. The result in some extreme cases has been an almost complete abandonment of the ordinary decencies of life.

Dr. Fisher pointed out to me one home of this extreme type; all have been treated; and he assures me that a clearing of the moral atmosphere has already set in. Dr. Fisher is firmly convinced that the effect in reforming the moral life of the individual and elevating the moral tone of the community in extreme cases like this is going to be as marked as the economic results.

Dr. Fisher has been at work fourteen months; he has made a house-to-house canvass, and has located, he thinks, practically every case of hookworm disease in four counties; most of these he has treated or had local physicians to treat. He has organized sanitary leagues in most of the villages, has committed the school boards to the policy of supplying sanitary privies at all the schools, and has interested the people in sanitation at the homes. Some individuals and some whole families are holding out against treatment; but they are being ostracized by their neighbors, and it is only a question of a short time when they must yield to the force of enlightened public sentiment. The results which I witnessed here are not only gratifying, they are stirring. I predict that within five years the whole face of the country in those pockets of extreme infection will be changed and one will see here a new people and a new earth.

WICKLIFFE ROSE.

June 28, 1911.

Mr. F. T. Gates, 26 Broadway, New York City.

CHAPTER V.

REPORT OF THE SCIENTIFIC SECRETARY.

Addresses and clinics.—During the past year I have attended a number of medical meetings in different States, and have taken advantage of these trips to give public-health addresses before various audiences. In all I have given 73 addresses and clinics.

Lantern slides.—The policy has been continued of furnishing lantern slides to the State Boards of Health and of loaning slides to various persons who wished to deliver addresses on hookworm disease to colleges, schools, clubs, etc.; 1,723 such slides have been distributed to boards of health since the last report.

Charts.—A series of nine wall charts has been prepared, illustrating the anatomy and life history of hookworms, the effects of the disease, and methods of spread and prevention. These were issued by the Public Health and Marine Hospital Service and have been distributed to the State Boards of Health. Several sets are kept on hand to loan to persons who wish to deliver addresses on the subject.

Microscopic diagnosis.—Although the State Boards of Health are now equipped to make microscopic examinations for hookworm infection, a considerable number of specimens are still sent to the Hygienic Laboratory. It is my general policy, however, to encourage people to send these specimens to the State laboratories. When at any time the State authorities have more work in this line than they can perform, the Hygienic Laboratory is prepared to meet the emergency. On

one occasion this past year, for instance, it became necessary to loan one of my men to a State laboratory and in addition to put five of my assistants at work in order to examine promptly the material, which accumulated too rapidly for the State laboratory to study it. My work is so arranged that we can help the State health authorities at any moment under such circumstances.

Correspondence.—It is a satisfaction to report that the routine technical correspondence is now transferred almost entirely from the Hygienic Laboratory to the State Boards of Health. As the work progresses, however, and as a greater number of physicians become interested, the nature of inquiries coming to me is undergoing a change. Physicians are beginning to make inquiries in respect to special features of the disease and to ask for references to literature in which they may find such special questions discussed. This indicates a deeper interest in the subject by the local physicians, and it is always a pleasure to be able to refer them to the literature desired.

Index to literature.—In the Index Catalogue of Medical and Veterinary Zoölogy, Doctor Hassall and I have compiled the world's bibliography of hookworm disease, by authors, so far as it was accessible to us. This publication was issued by the U. S. Bureau of Animal Industry and has been distributed to libraries and specialists. At present I am working upon a cross-reference to all of the titles, and I hope to have this ready for publication some time this year. It will probably be issued by the U. S. Public Health and Marine Hospital Service, and will be sent to all of the State Boards of Health. Such a publication seems very desirable at present as an aid to persons who wish to prepare articles on this disease, for it

is now exceedingly difficult for any one to trace the numerous articles that have been issued upon various phases of the subject.

Inspections.—Occasional inspections of schools have been made for various purposes, but this part of the work is now almost entirely taken care of by the State boards.

Field work.—Since the last annual meeting I have made preliminary surveys in two States in which the hookworm eradication work had not been instituted, namely, in Texas and West Virginia.

Texas.—The trip in Texas was undertaken at the request of the State Board of Health, and a special report covering the results obtained has been submitted to the Surgeon-General of the U. S. Public Health and Marine Hospital Service, to the Texas State Board of Health, and to the Commission. Briefly summarized, the results were as follows: Hookworm disease has been found on microscopic examinations or by examination of adult worms in persons living in at least forty-eight (48) counties in Texas; the infection is said to be present in at least two (2) other counties, but it is not clear that this statement is based upon microscopic examination. Most of the infection thus far determined was in the eastern part of the State. Undoubtedly additional counties will be found to be infected, as soon as they are studied.

The infection does not seem to be of uniform intensity in different localities, but in some regions about 30 per cent of the school children harbor the disease.

The results thus far obtained not only fully justify the State Board of Health in beginning a campaign against the disease, but indicate very clearly that such a campaign ought to be undertaken without unnecessary delay.

West Virginia.—At the invitation of the U. S. Bureau of Mines, I made a trip on one of the mine-rescue cars through part of the coal-mine district of West Virginia, establishing the presence of hookworm disease in nine localities. A brief report on the trip has been submitted to the Surgeon-General, to the State Board of Health, and to the Commission.

Colorado.—One of my colleagues in the Hygienic Laboratory, Assistant Surgeon S. C. Hotchkiss, has made sanitary investigations during the past summer among the miners of Colorado with special relation to lung disease among metal miners. During these studies, in 273 specimens of human feces examined microscopically, he did not find any infections with hookworms.

Mississippi.—At the request of the State Board of Health, I made a tour of Mississippi in company with Doctor Leathers, delivering addresses on hookworm disease and various other public-health subjects.

Hospital work at Wilmington.—Prior to July 1, 1911, it has not been possible under Federal law to admit patients from the general population to the U. S. Marine Hospitals. A bill passed the last Congress, however, which authorizes the admission "into said hospitals, for study, persons with infectious or other diseases affecting the public health, and not to exceed ten cases in any one hospital at one time."

As soon as this bill was signed by the President the late Surgeon-General Wyman, at my request, designated the U. S. Marine Hospital at Wilmington, N. C., for use in studying parasitic diseases. With four assistants, I studied there from July 1 to September 25. We examined for hookworms any persons who came to us, and had at the hospital a total of 172 entries (men and boys) for hookworm treatment. In connec-

tion with certain studies, I treated at their homes all the women and children who applied from one of the cotton mills.

Several articles have been published giving part of the results obtained. Pressure of other work has prevented me thus far from summarizing all of the work.

The most instructive case taken in was a boy of 16 years of age, "a stretcher case," admitted at the request of Doctor Ferrell, of the State Board of Health. This was clinically the most severe case of hookworm disease I have ever seen. When he was brought to the hospital there seemed to be little chance that he could live, but a conservative line of treatment resulted in expelling all of the parasites and in building him up to a point where he was able to return to his family.

My present plan is to return to Wilmington about May 1, and to remain there until October 1, continuing hospital studies on severe cases.

Investigations.—This past year investigations along the following lines have been continued as part of the regular work in the Public Health and Marine Hospital Service:

(a) On the viability of hookworm infection in the egg and larval stages outside the body.

(b) On a comparison of the various drugs used for treatment.

(c) On the safe disposal of night soil.

(a) *Viability experiments.*—At Wilmington, in coöperation with Surgeon Gardner and Mr. Harry Miller, I have obtained to date the following results:

(1) In microscopic examination of fecal material kept in water, all the hookworm eggs identified were dead after 68, 117, 144, 317, 323, 349, 357, and 358 days.

(2) The longest period of time after which we have thus

far been able to find live hookworm (*Necator americanus*) eggs under the conditions described has been 70 days.

(3) The longest periods after which we have thus far been able to find live eelworm (*Ascaris lumbricoides*) eggs under the conditions described have been 117 to 121 days. After 144 days, 2 *Ascaris* eggs were found in regard to which some possible doubt exists, but they were probably dead.

(4) It therefore seems fairly well established that fermentation for four months in an L. R. S. privy kills all hookworm eggs, and that fermentation for three months will kill nearly all, probably all, the hookworm eggs.

These conclusions are based upon conditions obtaining in eastern North Carolina.

(b) *Experiments with drugs.*—In my last annual report it was stated that Dr. W. H. Schultz, one of the pharmacologists of the Hygienic Laboratory, had begun an extensive series of experiments involving a comparison of all the different drugs and methods that have been recommended in treating hookworm disease. Doctor Schultz has published a brief preliminary report on part of the work, but a number of important scientific and practical questions have arisen which require further research, so that the appearance of his final report has been delayed. He and Dr. Atherton Seidell are now coöperating in the work, but it will be months before they will send the results of their experiments to press.

In practical hospital work, G. F. Leonard and I have come to the conclusion that in very severe cases, in which it is necessary to safeguard every particle of the patient's strength and when the slightest risk is contraindicated, it is a good plan to omit the preliminary dose of magnesium sulphate, usually administered prior to the administration of thymol. The principle

involved in omitting the preliminary dose of salts is: (1) part of the depression connected with the treatment can be avoided, thus increasing the element of safety for the patient; (2) in case numerous worms are present, at least some of them will be reached by the thymol, even without the preliminary salts, and the patient, after expelling some of the worms, will be able to build up to a point that will enable him to undergo the standard treatment. Thus, in one "stretcher case," when all chances seemed to be against the patient, 347 worms were expelled by the administration of 10 grains of thymol, followed but not preceded by salts. The patient was so weak prior to treatment that it seemed as if every breath might be his last. We did not dare administer the standard method of treatment, but by following the course adopted we were able to relieve him of the accumulated effects of 347 worms and thus to gain strength for further treatment.

It is generally assumed that in "stretcher cases" the death rate is of necessity high, since these patients are almost in a dying condition when they reach medical attention. Our Wilmington experience this year raises the question whether it will not be possible to reduce the death rate of the "stretcher cases" by this very simple modification of the standard treatment.

(c) *Disposal of night soil.*—In last year's report an account was given of some experiments by Surgeon Gardner and myself with the burial of human feces. A criticism has arisen in regard to two of our experiments, based on the fact that part of the sand used was not sterilized. Considering the circumstance under which the experiment was performed, this criticism seems to me of only academic nature; nevertheless, as it has arisen, I repeated the experiment, with Mr. Harry Miller,

and fully confirmed the earlier conclusions by the following results:

One pint of fecal material, containing numerous fly larvæ, was buried in a standpipe under 48 inches of sterilized sand, and one pint under 72 inches of sterilized sand. From the surface of the former 752 adult flies, and of the latter 863 adult flies—a total of 1,515 flies—issued. The U. S. Bureau of Entomology has determined these insects as belonging to four species, as follows: *Sarcophaga* sp., *Helicobia quadri-setosa*, *Ophyra leucostoma*, and *Musca domestica*.

In connection with the studies at Wilmington, opportunity was presented to observe the presence of parasitic protozoa in a number of patients. Two species of amebæ (a pathogenic form, *Entamoeba histolytica*, and a very common non-pathogenic species *E. coli*) were observed. Most of the determinations of *E. coli* were made from cold stools containing the characteristic ameba cyst, which were recognized in stools up to 50 days old. *Lambliæ duodenalis* was also very common.

The general subject of these parasitic protozoa is intimately connected with the problems presented by the fly and the hookworm, for all of these animals are found in human feces and may be spread by soil pollution. That flies may act as mechanical carriers of hookworm eggs and larvæ has been demonstrated by Alessandrini (1904), F. Smith (1905), and Galli-Valerio (1905), and it seems exceedingly probable that they may also be important mechanical carriers of amebic, *Lambliæ*, and other protozoan infections. The flies not only breed in but they feed upon the infected night soil, which they might easily carry on their feet and body as well as in their intestine to the house, thus infecting foods with these germs. To demonstrate this point microscopically is not an easy under-

taking, but the following experiment by Mr. Harry Miller and myself lends circumstantial evidence to this idea:

Experiment 40.—Two Hodge flytraps were set for 24 hours, one in the privy, the other in the dining-room of the house, about 40 feet away from the privy. At the end of 24 hours, 293 flies were taken from the flytrap in the privy, and 1,742 were taken from the flytrap in the dining-room.

With such numbers of flies going from the privy to the dining-room, it seems almost inconceivable that they could not carry the spores of amebæ, *Lambliæ*, and other protozoa, or that they could not occasionally infect the food with hookworm larvæ.

The more these various problems, including typhoid and other bacterial soil-pollution diseases, are studied, the more clearly does the question of preventing these infections center at the privy, and it is not an exaggeration to state that the privy is the great public-health problem of the non-sewered districts. So thoroughly convinced of this point are Passed-Assistant Surgeon L. L. Lumsden (the Federal typhoid expert) and I, that we are concentrating our efforts as much as possible upon this structure.

Were cholera to start in the United States, its potential effects upon those districts not provided with sanitary privies or sewers can hardly be estimated, and it behooves our local health authorities to hasten the day when our present low sanitary index of 1.5 to 10 per cent in so many regions will be raised to at least 75 per cent.

The L. R. S. privy.—Passed-Assistant Surgeons Lumsden, Roberts, and I have continued our studies on the L. R. S. privy. Serious failures of this apparatus have come to our knowledge from three sources. In one of these the failure

was clearly due partly to allowing the effluent pipe to become occluded with a large piece of cloth, partly to filling the effluent barrel with dirt; in a second instance the failure is unexplained; in the third instance the odor was reported as intense, but ventilators were installed and the apparatus is being tried again. Our experiences in the laboratory convince us that the L. R. S. is superior to any other type of privy with which we have had experience, but we do not claim that it will work under all conditions and unless it is properly attended to. Experience indicates that it may be advisable to add at least a bucket of water per week to the liquefying barrel.

Experiments to dispose of the effluent by utilizing plants for this purpose have not yet given satisfactory results, but studies in this line will be continued in the hope that it may eventually be possible to develop an automatic privy which not only will not require emptying, but which may perhaps be utilized in raising some plant of economic value.

The County Health Officer.—During the twenty years that I have been engaged upon a study of practical health problems in this country, the fact has forced itself upon me that the county health officer is theoretically the most important and practically the weakest point in the entire public-health organization of the United States. Some of our counties have excellent county health officers, but in the vast majority of cases the men are underpaid for the work, and they therefore do not perform their duties properly; for the support of their families they are dependent upon their private practice among the people over whom they are called upon to exercise police powers, and as a result these powers are not exercised; too often the position goes to the "lowest bidder," and too often it goes to a political appointee, technically totally unfitted for the work.

To use a comparison, the county health officer may be compared with the sheriff or the local police, while the Federal health authorities may be compared with the U. S. Army. Today there is a tendency to demand that the Federal public-health service be increased. Much as I approve of strengthening the Federal service, as a member of that service I feel convinced that the average citizen does not fully appreciate the fact that this service cannot possibly make up for the present inefficiencies of the mass of our county health officers. We might just as logically expect that an increase in the standing army of the United States would obviate the necessity of having county sheriffs or local police as to expect the Federal public-health service to obviate the necessity of appointing and equipping proper local and county health officers.

Speaking from an experience of 20 years' work in Federal service, with a considerable portion of this time spent in actual field work in many different States, I cannot escape the conclusion that the most important single problem in public-health organization in our country is at present centered in the question of the county and local health officer rather than in Washington, and I wish to add all the emphasis in my power to that part of the report of the Administrative Secretary which deals with this point. If the counties in our Gulf-Atlantic States had active, properly trained county health officers, this Commission would not be able to find any work there to enable it to carry out its trust, and I know of no way by which we can more quickly finish our work, and thereby render ourselves useless, than by encouraging the development of a thoroughly efficient system of county health officers.

Publications.—During this past year the following publications, consisting of or based upon original articles prepared in

the Hygienic Laboratory and bearing on hookworm disease and soil pollution, have been printed:

STILES (C. W.):

- 1910x. General considerations of uncinariasis. [Abstract of paper read before 112 Ann. Meet. Med. & Chir. Faculty of Md., Balto., Apr. 26-28.] < J. Am. M. Ass., Chicago, v. 54 (21), 21 May, p. 1720.
- 1910y. The influence of hookworm disease on the tuberculosis death rate. [Presented Mar. 15.] < Trans. North Carolina Ass. for the prevention of tuberculosis, pp. 28-30.
- 1910z. Hookworm disease. [Reprint of Soil pollution as cause of ground-itch, hookworm disease (ground-itch anemia), and dirt-eating. Pub. (1), Rockefeller Sanitary Commission, 1910h, pp. 1-27, figs. 1-26.] < Health Bull., St. Bd. Health, Miss. Jackson, v. 1 (2), Oct., 23 pp., figs. 1-26.
- 1911a. Idem. [Idem.] < Report St. Bd. Health Mississippi from Sept. 30, 1909 to June 30, 1911, Jackson, pp. 121-143, figs. 1-26.
- 1911b. The sanitary privy; its purpose and construction. [Reprint of Pub. Health Bull. (37), U. S. Pub. Health and Mar.-Hosp. Serv., Wash., 1910 o, pp. 1-24, figs. 1-12.] < Ibidem, pp. 168-189, figs. 1-12.
- 1911c. Idem. [Idem.] < Health Bull., Jackson, Miss., v. 1 (8), June, 22 pp., figs. 1-12.
- 1911d. Discussion of the sanitary outhouse. [Read before Am. Med. Ass., St. Louis, June, 1910.] < J. Am. Med. Ass., Chicago, v. 56 (4), Jan. 28, p. 255.
- 1911e. Is the so-called "cotton-mill anemia" of the Gulf-Atlantic States due to the lint or to uncinariasis? [Abstract of 1911f.] < Ibidem, v. 57 (6), Aug. 5, p. 507.
- 1911f. Idem < South. Med. J., Nashville, v. 4 (6), July, pp. 508-513.
- 1911g. Is the so-called "cotton-mill anemia" of the Gulf-Atlantic States due to lint or to hookworms. [Secretary's abstract of 1911f, read before the Helminthological Soc. of Washington, Jan. 6.] < Science, N. Y., (848), v. 33, Mar. 31, 511.
- 1911h. Underlying causes of the existence of soil pollution in rural districts < South. M. J., Nashville, v. — (—), Feb., pp. —.
- 1911i. The influence of hookworm disease on the apparent age of children in cotton mills < Ibidem, v. 4 (4), May, pp. 325-328.

- 1911j. Idem. [Secretary's abstract of 1911i, read before the Helminthological Soc. of Washington, Mar. 31.] < Science, N. Y., (848), v. 33, Mar. 31, 511-512.
- 1911k. The Rockefeller Sanitary Commission for the eradication of hookworm disease; first annual report of the scientific secretary for the year ending January 25, 1911. < Publication No. 2, Rockefeller Sanitary Commission, Wash., pp. 1-20, 1 fig.
- 1911l. Idem. [Reviewed.] < J. Am. M. Ass., Chicago, v. 66 (18), May 6, 1332-1333.
- 1911m. [Findings in fecal examination of 82 Southern school children aged 6 to 12 years.] [Secretary's abstract of paper read before the Helminthological Soc. of Washington, Apr. 11.] < Science, N. Y., (860), v. 33, June 23, p. 975.
- 1911n. [Rural sanitation.] [Idem. Oct. 8.] < Ibidem, (840), v. 33, Feb. 3, pp. 197-198.
- 1911o. The rural health movement < The Pub. Health Movement, Am. Acad. Pol. and Social Sci., Phila., pp. 123-126.
- 1911p. Hookworm disease. [Treatment.] [Secretary's report of address before first ann. conference Tenn. St. Bd. Health with county and city health officers, Nashville, Apr. 6.] < Rep. St. Bd. Health Tenn., from Jan. 1909 to Jan. 1911, Nashville, pp. 336-353.
- 1911q. Idem. [General.] [Idem, Apr. 7.] < Ibidem. pp. 373-383.
- 1911r. [Discussion on municipal control of privies.] [Idem.] < Ibidem, pp. 461-462.
- 1911s. The presence of *Entamoeba histolytica* and *E. coli* in North Carolina < Pub. Health Rep., U. S. Pub. Health and Mar.-Hosp. Serv., Wash., v. 26 (34), Aug. 25, 1276.
- 1911t. The presence of *Lambliia duodenalis* in man in North Carolina and the recognition of amebæ in feces several days old < Ibidem, v. 26 (36) m Sept. 8, 1347-1348.
- STILES (C. W.) and GARDNER (C. H.) :
- 1911a. Soil pollution by hookworms. [Review of Pub. Health Rep., 1910, v. 25 (50), Dec. 16, 1825-1830.] < J. Am. M. Ass., Chicago, v. 56 (11), Mar. 18, p. 831.
- STILES (C. W.) and LEONARD (GEO. F.) :
- 1911a. Administration of Thymol in hookworm disease < Pub. Health Rep., U. S. Pub. Health and Mar.-Hosp. Serv., Wash., v. 26 (49), Dec. 8, p. 1925.

- 1911b. Idem. [Reviewed.] < Bost. Med. & Surg. Journ., Boston, v. 165 (25), Dec. 21, p. 961.

STILES (C. W.) and LUMSDEN (L. L.):

- 1911a. The sanitary privy < Farmers' Bull. (463), U. S. Dep't. Agric., Wash., Aug. 22, pp. 1-32, figs. 1-9.
- 1911b. Idem. [Review.] < J. Am. M. Ass., Chicago, v. 57 (17), Oct. 21, pp. 1371-1372.
- 1911c. Different kinds of privies. [Extract from 1911a.] < Bull. Ill. St. Bd. Health, Springfield, Ill., v. 7 (9), Sept., pp. 509-528, figs. 1-9.

STILES (C. W.) and MILLER (H. M.):

- 1911a. The ability of fly larvæ to crawl through the sand < Pub. Health Rep., U. S. Pub. Health & Mar.-Hosp. Serv., Wash., v. 26 (43), Aug. 25, 1277.
- 1911b. Observations on the viability of eggs of hookworms (*Necator americanus*) and of ellworms (*Ascaris lumbricoides*) in feces allowed to decompose in water < Ibidem, v. 26 (41), Oct., 13, pp. 1565-1567.
- 1911c. [Hookworms from Kentucky.] [Secretary's abstract of paper read before the Helminthological Soc. of Washington, Feb. 9.] < Science, N. Y., (850), v. 33, Apr. 14, p. 592. [Also reprint, p. 2.]

The Farmers' Bulletin on the Sanitary Privy, prepared by Dr. L. L. Lumsden and myself and issued by the U. S. Department of Agriculture, has been in great demand, and, according to information obtained from the Editor of the Department, it has been placed on the permanent list and will be sent free to all persons who apply for it.

[PUBLICATION NO. 6]

THE ROCKEFELLER SANITARY COMMISSION
FOR THE
ERADICATION OF HOOKWORM DISEASE

HOOKWORM INFECTION
IN
FOREIGN COUNTRIES

OFFICES OF THE COMMISSION
WASHINGTON, D. C., U. S. A.

1911

by THE ROCKEFELLER SANITARY COMMISSION

FOR THE

ERADICATION OF HOOKWORM DISEASE

HOOKWORM INFECTION

IN

FOREIGN COUNTRIES

OFFICES OF THE COMMISSION

WASHINGTON, D. C., U. S. A.

1911

RC 248

.R5

no. 6

Y7233 311
70 311
Y7233 311

THE ROCKEFELLER SANITARY COMMISSION

F. T. GATES
Chairman

WILLIAM H. WELCH
SIMON FLEXNER
E. A. ALDERMAN
D. F. HOUSTON
P. P. CLAXTON
WICKLIFFE ROSE

Administrative Secretary
725 Southern Building
Washington, D. C.

J. Y. JOYNER
WALTER H. PAGE
H. B. FRISSELL
J. D. ROCKEFELLER, JR.
STARR J. MURPHY
C. W. STILES
Scientific Secretary
24th and E Sts. N. W.
Washington, D. C.

L. G. MYERS
Treasurer

INTRODUCTORY NOTE.*

The Commission has undertaken to get information on hookworm disease in foreign countries. A letter was prepared asking for information on: 1, whether or not the country has been found infected; 2, the geographic distribution of the infection within the country; 3, an approximate estimate of the degree of infection; 4, whether the infection is surface or mine infection; 5, what is being done by private or public agencies to eradicate or relieve it. Through the good offices of the late Surgeon General Wyman this letter was sent out by the Department of State with a covering letter as an official inquiry to American representatives in all foreign countries. This was followed by correspondence with physicians and public health authorities in these countries; these reports were supplemented by reference to the voluminous literature of the subject on file in the library of the Surgeon General's Office, U. S. Army. The information thus gained is here summarized. The geographic distribution of the infection is exhibited on maps 1 to 6.

Some features of the exhibit call for special attention:

a. Extent of the infection.—Hookworm infection belts the earth in a zone about 66 degrees wide, extending from parallel 36° north to parallel 30° south; practically all countries lying between these two parallels are infected.

Of the foreign countries from which the Commission has received reports, 54 are infected. In six of these coun-

* This introduction is reproduced as summary in the Annual Report for 1911.

tries—Wales, Germany, Netherlands, Belgium, France, and Spain—the infection is wholly or chiefly confined to mines, and is found in but few definite localities; in at least 46 of these countries the infection is general and widespread. Tabular statement on page 86 shows that these 46 countries comprise an area of about 14,464,158 square miles and have a population of about 919,858,243. To this we may add 11 of our own States, with an area of 510,149 square miles and a population of 20,785,777. Of the total population of the globe—about 1,600,000,000 people in round numbers—about 940,000,000 live in countries where hookworm disease is prevalent.

b. Degree of infection.—In many countries the infection is extremely prevalent. In 1904 it was estimated that 90 out of every 100 of the working population of Porto Rico were infected. My own observations in the island convince me that this estimate was not excessive. The reports summarized in Publication No. 6 estimate: That of the whole population of Colombia living between sea-level and 3,000 feet above, 90 per cent are infected, and this includes the great majority of the 5,000,000 of people living in this country; that of the total population of British Guiana, 50 per cent are infected, the percentage of infection among the laborers on the sugar estates being much greater; that in Dutch Guiana the infection on many plantations runs as high as 90 per cent; that over a thousand microscopic examinations in French Guiana showed an infection of 35 per cent among a local population, 50 per cent among soldiers, and from 50 to 88 per cent among prisoners; that in Egypt general estimate places the infection at 50 per cent of the laboring population; that 50 per cent of the coolie laborers

on sugar and tea estates in Natal are infected, with the disease spreading among natives and Europeans; that on many plantations in Ceylon the infection runs as high as 90 per cent; that of the 300,000,000 of people of India, 60 to 80 out of every 100 harbor the parasite; that on rubber plantations in the Malay States the infection runs from 47 to 74 per cent; that the southern two-thirds of the Chinese Empire is involved with the infection in many places in the Yang-tse Valley running as high as 70 to 76 per cent among the farming population; that of the entire population of American Samoa, about 70 per cent are infected.

c. Economic significance of the disease.—The economic loss resulting from the disease is enormous. The physically sound coffee-picker in Porto Rico picks from 500 to 600 measures of coffee per day; scores of anemics told me they could pick only from 100 to 250 measures per day. According to estimates given me by the managers of a number of large haciendas in Porto Rico, the disease has reduced the average efficiency of the labor on these plantations to from 35 to 50 per cent. Dr. William M. McDonald reports that the disease is "sapping the life and energy of the population of Antigua." Dr. Parker, of Ecuador, says: "Last fall I visited one of the largest cocoa plantations near Babahoyo and found that the anemias of hookworm and chronic malaria made available not more than 33 per cent of work of the 300 laborers on that place." Dr. E. Brimont reports: "The disease has greatly retarded the development of French Guiana." The report from British Guiana says: "The economic loss due to hookworm disease on the sugar estates is heavy. On one estate, where the laborers were treated on a large scale, the manager reported that 'the

working power of the gangs had increased 100 per cent.'” The report from Colombia, after stating that the infection is among the miners and in abundant profusion throughout the agricultural sections, where the laborers on the coffee, sugar, rubber, tobacco, banana, and other plantations are seemingly all affected, says that “one of the greatest problems with which the people of Colombia are confronted at the present time is that of the evils attendant upon the presence of hookworm infection.” Dr. T. F. McDonald, of Queensland, reporting conditions in the Johnstone River district, says that infection is present in every square mile of it, and that “it is sucking the heart’s blood of the whole community.” The Right Honorable the Earl of Crew, Secretary of State for the Colonies, in his dispatch on this subject to the Governor of Ceylon, says: “Having considered the reports from the several colonies, with the observations of the committee upon them, I recognize that the loss of labor caused by the prevalence of ancylostomiasis is very serious, and affects prejudicially not only the employers of labor, but the community at large. Not only is there serious loss of life, direct and indirect, but also through the invaliding of laborers the charges for hospital and pauper expenditures are largely increased.” In 1908 Dr. Braddon examined 2,000 sick Tamils on the rubber estates in Negri Sembilan, Malay States, and says “there was no single one of these coolies who was not affected by ancylostomiasis”; “that 60 per cent of all coolies *at work* were in an advanced state of ankylostomiasis.” Dr. Graham, reporting for Lower Perack, Malay States, says that more than 50 per cent of the entire population is infected and that the disease is of “great economic importance to the rubber industry.”

In our own country Dr. Herbert Gunn, special inspector for the California State Board of Health, in his report on hookworm infection in the mines of that State, says: "There is no question that the general efficiency of the men is noticeably impaired. At one mine, employing about 300 laborers, it was stated that a reserve of about 25 men had to be available to replace those who, on account of sickness, did not appear for work. Quite a few of the men have to lay off every now and again to recuperate. Several who were unable to work stated that when they arrived in Jackson they were perfectly strong and well. A large number of these men were encountered on the streets, some of them presenting marked degrees of anemia. The greatest loss to mine operators is occasioned by the large number of those moderately affected. * * * A loss of 20 per cent in efficiency of those infected would be a conservative estimate. That would mean in Mine No. 2, for instance, where over 300 men are employed at an average of about \$2.50 per day, and estimating the number of those infected as low as 50 per cent, a loss of over \$20,000 a year."

This estimate is for *one mine*. Dr. Gunn reports "that infection undoubtedly is present in practically all of the gold mines of California. Infection is present, also, among agricultural laborers of that State."

But the infection in California is light as compared with nine or ten of our South Atlantic and Gulf States, with their 20,000,000 of people. If an infection of 50 per cent in one gold mine employing 300 men causes a loss conservatively estimated at over \$20,000 a year, what must be the economic significance of this disease for India, with its 300,000,000 of people and from 60 to 80 per cent of them infected?

d. Retarding effect on education and civilization.—A photograph on file in this office shows a group of children, no one of whom until this year had ever been in a school; no member of their parents' family, of the grandparents' family, or their great-grandparents' family on either side had ever gone to school. We have in this family a record of at least four generations of illiteracy due to the disabling effects of hookworm disease. In the community in which this family lives are many other families showing a similar history. I have visited many communities in which a large proportion of the children have been kept out of school by disability due to this cause. I have visited schools and have on file records of many others in which all or a large proportion of the children attending are infected. Records of the definite survey show in extreme cases an average infection among rural children of school age for whole counties running as high as 70 to 90 per cent.

The statement by Dr. E. Brimont, that "the disease has greatly retarded the development of French Guiana," is applicable even in greater degree to many other countries. Acute disease may strengthen a race by killing off the weak; but hookworm disease is chronic. It works subtly through long periods of time, and its cumulative results—physical, intellectual, economic, and moral—are handed down as an increasing handicap from generation to generation. The letter on page 102, Second Annual Report of the Rockefeller Sanitary Commission, showing the effects of the disease on one community, is a statement in concrete miniature of what it means in the large. This letter portrays a situation which for our States is extreme; but many countries, like Egypt, India, and China, have suffered a heavy infection for cen-

turies, and its results have been handed down from generation to generation for ages as a cumulative handicap to the development of these people in all things that make for civilization.

e. Spread of the infection by immigration.—It is estimated that from 60 to 80 per cent of the total population of India are infected. Every country importing coolie laborers from India is bringing on to its own soil a heavy stream of infection. In Assam Dr. Bently examined 600 Indian coolies just arrived, and found only one of them free from infection. When the attention of the government at Durban was called to the heavy infection among the coolie laborers on the sugar estates of Natal in 1908, the authorities examined the next shipload of coolies from India and found 93 per cent of them infected. The Indian coolie is the chief source of labor supply for British Guiana; examination of all coolies arriving for the year 1909 showed an average infection of 74.44 per cent; this importation of coolie labor is regarded as the source of the present extremely disastrous infection in that country. About 16,000 Indian coolies have been imported into Jamaica, and it is estimated that 50 per cent of them are now infected. By the importation of coolie labor the infection has been carried and is being carried from India also into Dutch Guiana, Ceylon, the Federated Malay States, the Straits Settlements, and Java. The health authorities at San Francisco examined a shipload of Indian coolies just arrived at that port last year, found an infection of about 90 per cent, and established quarantine against further immigration of this type. Every group of Indian coolies now in California is a center from which the infection is spreading in that State. From

the outbreak of the disease in the St. Gothard tunnel the infection was carried into the mines of Austria, Belgium, and Germany. In these countries large sums have already been spent in a systematic effort for its eradication.

These, among a multitude of similar facts, suffice to show that hookworm disease, in the light of our present knowledge, has ceased to be a local matter ; it is an international problem of serious proportions.

WICKLIFFE ROSE,
Administrative Secretary.

HOOKWORM INFECTION IN FOREIGN COUNTRIES.

I. AFRICA.

ALGERIA.

1. **Distribution of infection.**—Albert W. Robert, American Consul at Algiers, reports infection in the oasis of Hodna, Province of Algiers, and in the vicinity of the town of Mostaganem, Province of Oran.

Sergent and De Mouzon report a heavy infection in the Oasis Mdoukal, Province of Hodna, and add this suggestive information: "It is a standing custom of the inhabitants of Mdoukal to emigrate each year to the number of about 150 to seek work in the coast towns. They reside in these towns for several years, then after they have accumulated some money return to Mdoukal. All those in whose stools we discovered *Ancylostoma* eggs at Mdoukal had lived for several months at Algiers. * * * These poor people among whom we demonstrated a heavy infection traverse the whole of Algeria in their journeyings."

Thomas H. Kearney, in describing the workers in the date gardens of Nefta and Tozer in the Jerid, Tunis, speaks of the "lank forms and sullen anemic visages of the residents of the Jerid."

These date gardens in the oases are jungles of tropical growth abundantly watered by irrigation; the climate, the shade, the moisture, make an ideal incubator for the eggs and larvæ of the parasite. In these groves the natives work with bare feet and unprotected legs and hands. All these

facts taken together make it highly probable that the infection exists in practically all the oases throughout Algeria and Tunis.

2. **Degree of infection.**—Sergent and De Mouzon examined 7 anemics at Mdoukal and found 7 infected; they examined 8 persons taken at random showing no signs of anæmia and found 4 of them infected. The Consul at Algiers reports cases as “very common in the Hodna and erratic only near Mostaganem.” Dr. Ferrier examined at Mostaganem about 100 persons and found 8 infected (Bull. Med. de l’Algerier, Alger., 1905, XVI, 482-488).

3. **Relief measures.**—Nothing is being done to relieve the present sufferers or to eradicate the disease.

BRITISH EAST AFRICA AND ZANZIBAR.

1. **Prevalence of the disease.**—Alexander W. Weddell, American Consul, reports that in British East Africa the disease has been recorded as present in Mombasa, Malindi, and Voi; that it is well known to the coast tribes under the name of “safura.”

For *Zanzibar* he reports that for the six months ending June 30, 1911, there were reported 122 deaths from hookworm disease on the Island of Zanzibar. These deaths were distributed as follows:

Mkokotoni District (agricultural).....	76
Mwera District (agricultural).....	44
Chwaka District (many fishermen).....	2
<hr/>	
Total.....	122

2. **Preventive measures.**—According to the above report, routine treatment is given in the Government Hospital, Poor House, and prisons to natives showing pallor. For British East Africa the Government authorities say: "It is hoped that the schemes for sanitary improvement which are under consideration will result in the incidence of the disease being lessened."

EGYPT.

1. **Distribution of infection.**—The infection is heaviest in the Delta, but it is present in every province; it is confined chiefly to agricultural laborers; recruiting officers find it less severe among black troops. Dr. Looss reports finding only the *Ancylostoma duodenale* present.

2. **Degree of infection.**—No exact investigation to determine the degree of infection has been made; it is reported very heavy. (Department of Public Health of the Egyptian Government.) Of all autopsies at Kasr-el-Aing Hospital, Cairo, 90 per cent of cases were infected. (Dr. A. G. Salter.) General estimate places the infection at about 50 per cent of the laboring population.

3. **History.**—For centuries Egypt has been a center from which the infection has spread to other countries. A papyrus written about 3460 years ago gives an accurate description of the A. A. A. disease, which some authors interpret as hookworm disease. In 1833 Mr. Hamant reported its presence among the peasants and soldiers. In 1883 Sandwith is struck with the anæmia among the soldiers in the Cairo hospital. Treatment began in 1887. In

1894 Dr. Looss came to Alexandria and Cairo and later he worked out the life-history of the parasite.

4. **Conditions favoring the spread of infection in Egypt.**—Latrines unknown; laborers work all day with bare feet, bare legs and hands exposed to damp infected earth (F. M. Sandwith). Temperature makes this possible the year round.

5. **What is being done to alleviate or eradicate the disease.**—Treatment is given at the Government hospitals and dispensaries. Public latrines in the mosques are made as sanitary as possible; no general movement for its eradication.

GOLD COAST COLONY.

1. **Prevalence of infection.**—The British Secretary for the Colony reports: "Hookworm disease is prevalent in the Colony. The parasite *Necator americanus* appears to be existent rather than *Ancylostoma duodenale*. Its presence has been demonstrated in Fanti country, Akyem and Volta River District. Dr. Fisch, Basel Mission, estimates the degree of infection in Aburi as over 50 per cent in natives there, but there has been no official estimate. Workers in mines would appear to be little affected, the districts above mentioned being mostly agricultural; but cases have been recorded in Europeans working in mines."

2. **Preventive measures.**—The report continues on this point: "The steps taken are those of general sanitary principles in connection with washing places and latrines, and the question of applicability of the MacGregor principle is under consideration."

LAGOS.

1. **Prevalence of infection.**—Dr. Henry Strachan, Chief Medical Officer, reports the discovery of uncinariasis in Lagos*: “There is marked mortality among the natives from ‘dropsy’ and ‘anæmia’. On seeing some of the cases so diagnosed, I was struck with the resemblance to the ancylostomiasis of the West Indies, and on examination the presence of the causative parasite was at once demonstrated.” Treatment with thymol proved efficacious.

NATAL.

1. **Discovery.**—The presence of hookworm infection in Natal was first demonstrated by the discovery of hookworm eggs by Dr. Boufa of Tougatt in 1906. This discovery was repeated two months later by Dr. John J. Elliott, Indian Medical Officer at Verulam.

2. **Prevalence of the infection.**—The population of Natal consists of natives 700,000, Europeans 80,000, Indians 200,000. Investigations conducted by Dr. Elliott show:

(1) Of the coolie laborers on the sugar and tea estates about 50 per cent are infected.

(2) Of the Indian population at the port of Durban about 80 per cent are infected.

(3) From the 200,000 Indians the infection is spreading to the native kafirs. The infection is spreading from the coast inland.

(4) The infection is spreading among the Europeans.

3. **Conditions in Natal favoring the spread of the in-**

* J. Trop. M., Lond., 1898-9, v. I, p. 208.

fection.—Heat tropical in intensity; rainfall regular and plentiful on the plantations.

The Indian coolies are herded in barracks; they go barefooted and wear scant clothing; their idea of sanitation and personal cleanliness is of the most elementary; it is a prevailing custom to keep wholesale scavengers attached to the barracks in the shape of swine, hens and muscovy ducks; the children, barefooted and bare-bodied, play in the filth around the barracks, become heavily infected and cannot be made to conform to sanitary regulations.

The 700,000 native kafirs are herded in great "locations" or "settlements". They are being brought into closer and closer relations to the Indians and the infection is spreading among them. Indian traders and free farmers circulate freely over the whole colony.

"The open life led by Europeans in Natal, the dwelling in tents in the hot season, and in beach residences with imperfect closet arrangements, the *al fresco* habits of Indian servants attached to households, the custom of allowing white children to run barefooted or sandaled, all contribute toward the spread of the disease among Europeans."

4. Origin of the infection.—Dr. Elliott of Verulam and Dr. Turner of Johannesburg attribute the spread of hookworm infection in Natal and Southeast Africa to the importation of coolie laborers from India. The 200,000 Indians in Natal represent the results of an unchecked immigration mainly from Calcutta and Madras for 40 years. A recent report states that the great majority of the whole native population of India is infected with hookworm disease. The infection was first discovered in 1906 among the Indian coolies; further examinations showed heavy in-

fections all along the coast from Cape Colony to Zulu. It was discovered later that immigrants fresh from India showed heavy infection. In 1908 the attention of the Government of Natal was called to the fact that recent shiploads had shown a large percentage; the Health Department examined the next immigrant ship and found 93 per cent infected.

Dr. Turner in a report giving the results of post-mortem examinations of natives newly arrived in Johannesburg shows no infection found among the natives living in Cape Colony, Orange River Colony, Transvaal, Bechuanaland, Basutoland, Matabele and Mashona; but of the natives from seaport districts the infection is heavy, the percentage of infection of all those examined being for the Mozambique Tribe 64; Quillemane 64; Beira 100; Nyassa 54; Myambaan 35; Shangaan 35; British Central Africa 25; Angoni 18. These facts are interpreted as indicating that the infection is from India; that it is spreading in Africa along the seaport and thence inland to the native races by contamination by Indian traders and coolie laborers.

5. What is being done to control the infection.—When in 1908 the Government of Natal was advised by the Health Department that of the immigrant ship inspected 93 per cent were found infected, a cabinet meeting was called and it was decided to send the shipload back to India. This was abandoned for the reason that to be consistent every infected sugar and tea estate in the colony would have to be cleared of its Indians and this was too big an undertaking. The ship was quarantined for months; succeeding ships have been held in quarantine by the Government. The Colonial Health Department has thus made itself very un-

popular with the planters of Natal. On the estates the coolies are being treated. Latrines are supplied at many of the barracks but the regulations for their use are not lived up to, the children especially resist regulations and the workers persist in polluting the soil in the cane fields. During the year 1911 all infected immigrants have been given one course of treatment before being assigned to estates. (Information by A. B. Stewart, American Consul at Durban.)

SIERRA LEONE.

1. **Distribution of infection.**—The Colonial Secretary reports that, up to the present, infection has been found only at Freetown; here it is common among the poorer classes.

2. **Degree of infection.**—Data insufficient for an approximate estimate of degree; infection is reported as "common among poorer classes" at Freetown; as not seeming "seriously to trouble the inhabitants."

3. **Relief measures.**—Nothing is being done to eradicate the disease.

TUNIS.

1. **Distribution of infection.**—Doctors E. Gobert and G. Gatouillard in describing the inhabitants of South Tunis say: "The traveler who goes for the first time into the oases of Tozer, of El Oudiane, or of Nefta is struck at once by the physical decadence of the population and the great number of extreme anemics that he meets. These anemics are very often inveterate dirt-eaters. It was the discovery of this that led us to make a systematic investigation for *Ancylostoma*." This investigation demonstrated the pres-

ence of infection at these places. Dr. P. Sonsino demonstrated the presence of hookworm at Gabés and at Gafsa.

This later report confirms the judgment expressed when describing the date gardens of the Jerid in connection with conditions in Algeria. (See Distribution of Infection in Algeria.)

2. **Degree of infection.**—There has not been sufficient investigation to justify an estimate of the degree of infection. Gobert and Gatouillard examined 107 persons and found 22 of them infected; only one slide was examined in each case; clearly the percentage of infection was much heavier. They found also a heavy infection of other intestinal parasites. The dirt-eating habit among these people is extreme; 60 per cent of those found infected were confirmed dirt-eaters. The dirt-eater keeps a large store of his choice dirt at his house and carries a small bit with him wherever he goes.

3. **Relief measures.**—Nothing is being done to alleviate or eradicate the disease.

II. THE AMERICAS.

ANTIGUA.

1. **Distribution of infection.**—In 1897 Dr. Galgey of St. Lucia, reported the disease as endemic and prevalent all over the West Indies. Dr. H. A. A. Nichols (1900a), of Dominica, quotes the statement with approval;* he reports further that infection is not uncommon in Dominica, but on account of sparse population and an abundance of pure running water the chances of infection are much less than in Antigua; that infection is extremely prevalent in Antigua; that conditions indicate that it has been here for a long time and is the same as the “negro cachexy” described by early physicians.

2. **Degree of infection.**—In the light of present knowledge the degree of infection cannot be stated in terms of percentages. Dr. Wm. M. McDonald (1900a), Acting Medical Superintendent at Halberton Institute, Antigua, states that within 13 months he had in the hospital 148 cases; that these were extreme; that all had been unable to work for from 6 to 12 months; that 34 of them died; that the disease is sapping the life and energy of the laboring population of Antigua.†

3. **Conditions favoring spread of infection.**—Dr. McDonald states that the population is dense; that the water supply is the worst, being dirty pond water; that all cane fields are open latrines; that during rains, the wash from

* J. Trop. M., Lond., 1900, v. 2, p. 247.

† J. Trop. M., Lond., 1900, v. 2, p. 297.

these cane fields finds its way into the ponds that supply drinking water to the natives. To this may be added the tropical climate and the habit of going barefooted the year round.

4. **Relief measures.**—According to Dr. McDonald nothing is being done to relieve the situation. Even the sick are not properly cared for. He has reported the situation to the Government.

ARGENTINA.

1. **Disease not prevalent.**—The American Consul at Buenos Aires, R. M. Bartleman, submits a communication from the National Department of Hygiene, stating that in the Federal Capital statistics have been kept of about 31 cases of hookworm disease; that these are imported cases; that the disease does not exist in Argentina.

BARBADOS, W. I.

The American Consul at Barbados reports:

1. **Distribution of infection.**—"The country is infected. The districts chiefly infected are the Parishes of St. Andrew, St. Joseph, and the lower part of St. John, but occasionally cases occur in the other parishes. * * * Infection is agricultural."

2. **Degree of infection.**—"In the absence of reliable statistics an approximate estimate of the degree of infection can not be given, but the number of cases is not great, or at any rate, the cases that present severe symptoms."

3. **Relief measures.**—"Ordinary sanitary by-laws are enforced as far as possible but no special measures are directed against the disease."

BRAZIL.**1. Distribution of infection.**

a. Para: Consul George H. Pickerell, at Para, reports: "Hookworm infection undoubtedly exists in the whole Amazon River District. This opinion is based upon our local hospital practice, the hospitals accepting persons coming from interior points or other states." He says that the infection is agricultural; that there are no mines.

b. Bahia: Consul S. P. Warner, Bahia, reports that "hookworm infection is general throughout the state of Bahia, especially among the lower classes"; that the infection is agricultural.

c. Sao Paulo: Paulo R. Pestano, Director of Commerce and Industry, at Sao Paulo, reports that hookworm infection in the state of Sao Paulo is most prevalent in the regions traversed by the Sorocabana, the Paulista, and the Central of Brazil railroads; that the infection is agricultural. Consul Jay White, at Santos, submits a map showing the infection to be distributed over practically the whole state.

d. Brazil as a whole: Dr. Sampio Vianna, for the Director General of Public Health at Rio de Janeiro, says that hookworm infection is observed in almost all the States of Brazil; that the disease is most prevalent in the northern and central regions. Mr. Lay, Consul General at Rio de Janeiro, writes: "This disease exists throughout a great section of the nation of Brazil."

2. Degree of infection.—The degree of infection cannot be definitely stated on the basis of available data. The infection is reported as heavier in the northern and central regions; in a state as far south as Sao Paulo, 151 of the

171 counties of the state reported deaths from hookworm disease for 1910. For 1909 there were 478 deaths from hookworm disease reported for the state of Sao Paulo; these by municipalities were: Taubate, 41; Sao Jose dos Campos, 36; Santos, 32; Jaher, 26; Beheduro, 23; Soccorro, 15; Botucatu, 10; Dais Corregos, 9; Barretos, 8; Agudos, 7; Bariry, 8.

3. **Relief measures.**—The Brazilian Government, acting on the vote of the Fourth Latin-American Medical Congress, held in Rio de Janeiro in 1909, has recommended through the General Department of Public Health the following preventive measures:

a. Protection, by the use of boots, of mine workers and all who handle brick, pottery, earth roofing material, etc., and all persons engaged in agriculture.

b. Disinfection of the excrement of persons infected with hookworm disease.

c. Disinfection of mines, of factories, and of the yards of farmers.

d. Isolation and treatment of infected persons, who should not be allowed to return to work until the stool is free from eggs of the parasite.

BRITISH GUIANA.

1. **Distribution of the infection.**—The whole of British Guiana is infected with hookworm disease. Infection is heaviest on the sugar estates which occupy practically the whole coastal area. It is agricultural mainly.

2. **Degree of infection.**—It is estimated that about 50 per cent of the population of the Colony are infected. (Robert

A. Crance, American Vice Consul.) The percentage of infection among the cooly laborers on the sugar estates is much greater. Of the Indian immigrants brought into the country in 1909, 74.44 per cent were infected. (W. F. Law, M. D., Medical Inspector.) On one ship this year (1911) the infection was 78.5 per cent. This immigration from India is the chief source of labor supply for the sugar estates.

3. **Origin of infection.**—It is not known whether there was any infection in the Colony before the importation of cooly labor from India; there is no evidence of its existence there previous to this time. The bulk of the labor supply for British Guiana consists of East Indians brought to the country under indenture. This immigration is bringing into the country a constant stream of new infection.

4. **Economic significance of the disease.**—Dr. Law, the Government Medical Inspector reports the economic loss due to hookworm disease on the sugar estates as heavy. On one estate where the laborers were treated on a large scale the manager reported that the working power of the gangs had increased 100 per cent.

5. **What is being done to alleviate or eradicate the disease.**—In 1888 Dr. Griem called attention to the existence of hookworm infection in British Guiana; since that time the subject has received increasing attention. From 1904 to 1908 about 39,000 cases were treated in the estate hospitals. In 1908 the Governor advised the estate owners that in future allotment of immigrants might be made conditional on the provision of suitable latrine accommodations. In his report for 1910 the Government Medical Inspector says:

"This mild compulsion has had such a good effect that now practically every estate has a good and effective latrine system, and planters who were formerly my strongest opponents are now firm believers in the usefulness of proper sanitary accommodations for their laborers."

In this same report the Medical Inspector calls attention to the new infection introduced by the immigrants; he says: "Last season was the worst we have as yet experienced in this direction, 74.44 per cent of the immigrants having been found infected on arrival. * * * Measures should certainly be taken either in India or on board ship to treat these cases, otherwise we shall be compelled in self-defense to isolate every one on arrival."

BRITISH HONDURAS.

1. **Distribution of infection.**—J. H. Hugh Harrison, Colonial Surgeon, reports* that hookworm infection plays an important part in the death rate of the colony; that infection is general through the colony; that it seems to be especially heavy along the banks of the Belize river and extending up to the frontier and also in the northern districts; that cases came to the hospital from Placencia, in the south, from Bacalar Chico in the north, and from so many places distributed over the Colony as to settle the question that infection is most general.

2. **Degree of infection.**—Dr. Harrison reports: "Post-mortems have demonstrated the fact that these parasites were present in about 70 per cent of the cases." Beyond such hospital work no systematic survey has been made.

* J. Trop. M., Lond., 1909, v. 12 (18), p. 275.

3. **Conditions favoring spread of infection.**—The people of the Colony, for drinking water and for bathing purposes, avoid running streams and prefer standing pools, which they say are collections of pure rain water. These pools are polluted. To this are added a tropical climate, primitive sanitary habits, and the custom of going barefooted the year round.

4. **Relief measures.**—The cases that come to the attention of private practitioners are being treated. No systematic relief measures have been adopted; the people are ignorant even of the presence of the disease.

COLOMBIA.

1. **Distribution of infection.**—Charles H. Small, vice and deputy Consul General at Bogota, reports that the great majority of the inhabitants of Colombia, the population of which is estimated at 5,000,000, live in the lowlands, where the temperature is between 60° and 100° Fahrenheit and the altitude varies from sea-level to perhaps 3,000 feet above; that it is reliably stated that nine out of every ten persons living in these districts are afflicted with hookworm disease; that the infection is among the miners, and is in abundant profusion throughout the agricultural sections, where the laborers on the coffee, sugar, rubber, tobacco, banana, and other plantations are seemingly all affected; that the parasite is also found in the higher regions, such as the plateau of Bogota, 8,000 feet above sea-level; but, on account of the cool climate, the infection in these higher regions is light.

2. **Degree of infection.**—On this point Mr. Small says: "In general, it may be stated that, with the exception of that

portion of Colombia situated at a greater altitude than 3,000 feet, the entire country is infected with hookworm, and that within the infected areas about 90 per cent of the inhabitants are victims of the pest."

3. **Conditions favoring the spread of the disease.**—This report continues: "The swampy, damp regions, filled with decomposing vegetable matter, and which predominate throughout the lowlands of Colombia, offer a fertile field for the increasing growth of the hookworm, especially in view of the fact that the native inhabitants of these districts are but little inclined to the practice of hygienic or sanitary measures of any kind."

4. **Relief measures.**—On this point Mr. Small says that, "according to the most prominent Colombian scientists, one of the greatest problems with which the people of Colombia are confronted at the present time is that of the evils attendant upon the presence of hookworm infection"; that "thus far the Government officials of this Republic have taken no official cognizance of the hookworm infection as a menace to the health of the people and its-retarding effects upon national progress"; that the investigations thus far made have been made by public-spirited physicians and scientists, and that they have all arrived at practically similar conclusions. "It is hoped," he says, "that in the future either the Government or some philanthropic organization will provide funds to be employed in a scientific and systematic attempt to eradicate this pest."

DOMINICAN REPUBLIC.

1. **Distribution of infection.**—F. M. Endicott, Consul General at Santo Domingo, reports that the greatest number of cases exist in the heart of the Cibao Province, where the population, entirely rural, is most widely infected; that in the province of Sabana de la Mar the disease has made rapid progress; that, with the exception of the southern portion of the island, the entire country is infected; that the infection is agricultural; that in the Cibao district the larvæ find conditions most favorable to their development; and that the natives earning their living solely from the cultivation of cocoa walk barefooted through the plantations and get the germs of the disease.

2. **Degree of infection.**—The degree of infection cannot be stated at present in percentages. Mr. Endicott reports on this subject: "It appears certain that it is spreading, and, far from decreasing, continues steadily on the increase. Certain regions where the disease had never been reported are at present infected. This could hardly be otherwise, as no hygienic precautions have been taken, and the natives of the country are completely ignorant of the most elementary laws of hygiene. The districts which have suffered most from this disease may be named in the following order: The Cibao Province, Sabana de la Mar, and the Seybo district."

3. **Preventive measures.**—There are none. In 1906 Dr. Defillo wrote in the *Revue Dominicaine*: "In view of the magnitude of the peril I have not been inactive. I duly informed the Minister of War of the serious fears I entertained of the spread of this disease. * * * If those

whose duty it is to watch over the public health shall not take all possible measures to check the invasion of hookworm disease, in a short while it will spread and produce among our countrymen as great ravages as it has already done among other peoples." Mr. Endicott says that no preventive measures have been adopted, and that the disease has spread.

ECUADOR.

1. Prevalence of hookworm infection.—Dr. Herman B. Parker, Passed-Assistant Surgeon, U. S. Public Health and Marine Hospital Service, reports under date of May 17, 1911:

"On my arrival in Ecuador I was impressed with the severe anemias that prevail here, and, shortly after the arrival of my laboratory outfit, verified the cause of these anemias as hookworm infection. I have not conducted any investigation as to the actual presence of the parasite outside of Guayaquil, but in the places visited I have met with the same severe clinical type of anemia that characterizes this infection.

"I noticed this anemia more particularly in the coast towns of the Province of Manabi, where the towns are built on or close to the sandy shores of the Pacific and have a primitive sewage disposal and a common unprotected water supply. Fishing, agriculture, and a small amount of commerce are the principal pursuits of those places."

There are few mines in Ecuador, and these are remarkably free from all infection, due to modern disposal of sewage and safe supply of drinking water.

"Regarding the altitudes," continues Dr. Parker, "a most interesting condition is met with; here the natives, more

particularly the Indians, are of a distinct physical type, being free from the anemias that characterize the lowlands, having clear complexions with rosy cheeks, showing the apparent absence of these infections."

2. **Economic importance of the disease.**—Dr. Parker reports: "Last fall I visited one of the largest cocoa plantations near Babahoyo and found that the anemias of hookworm and chronic malaria reduced the efficiency of the 300 laborers on that place to not more than 33 per cent."

3. **What is being done to eradicate the disease.**—Dr. Parker writes: "Nothing, by either public or private agencies, is being done to alleviate or eradicate the disease."

FRENCH GUIANA.

1. **Distribution of infection.**—Systematic examinations of prisoners and soldiers made by Dr. E. Brimont indicate that infection is general throughout French Guiana.

2. **Degree of infection.**—The degree of infection is indicated by the following results of Dr. Brimont's examination:

- a.* Prisoners at Saint-Laurent: examined, 406; infected, 71.92 per cent.
- b.* Prisoners at Saint Jean du Maroni: examined, 233; infected, 73.39 per cent.
- c.* Prisoners at Iles du Salut: examined, 157; infected, 50.95 per cent.
- d.* Prisoners at Cayenne: examined, 63; infected, 88.88 per cent.
- e.* Local population at Saint-Laurent: infected, 35 per cent.
- f.* Soldiers: total number examined not given; infected, 50 per cent.

The report further states that the disease has greatly retarded the development of French Guiana.*

3. **Relief measures.**—No report on this subject.

GUATEMALA.

1. **Distribution of infection.**—The fact that hookworm infection has been demonstrated in all the States of southern Mexico, in British Honduras, Honduras, and Salvador, would indicate that the whole of Guatemala is involved. The presence of hookworm infection in Guatemala was first announced by Dr. H. Prowe in 1889. His later investigations demonstrate a prevalent infection. He reports (1899a) that the infection seems to be most prevalent along the coast among the neighboring hills, and in the high valleys of the Cordillera; that in different parts of Guatemala he has met with many hundreds of cases of the disease.

2. **Degree of infection.**—The following records of investigations by Dr. Prowe serve as a rough index to the degree of infection:

- a. Hospital at Ritalhuleu, Guatemala, September, 1893, to March, 1894: of 522 patients received, 246 had hookworm disease.
- b. Of 83 autopsies, hookworms were found in 46 cases; in 25 of these cases it was the sole cause of death.
- c. On a coffee plantation, during 28 months 1,286 sick people were under care; of these, 528 had hookworm disease; 43 of these cases died of the disease.

3. **Relief measures.**—No report on the subject.

* Arch. de parasitol., Par., 1906, v. 10 (3), p. 459.

* Arch. f. path. Anat. [etc.], Berl., 1899, v. 7 (3), pp. 458-474.

HONDURAS.

1. **Distribution of infection.**—Claude I. Dawson, American Consul at Puerto Cortes, reports that hookworm infection prevails to a considerable extent throughout Honduras; that the infection is general, but is most prevalent in the interior and coast agricultural districts; that it is not frequently seen along the extreme north coast. Infection is rural and agricultural.

2. **Degree of infection.**—No systematic investigation has been made in Honduras. Mr. Dawson quotes an American physician on the northern coast as follows: "In this immediate section of the country it is extremely rare. In looking over my case records I find I have had only two cases in the last ten years. In the interior towns and rural districts there is a complete absence of all sanitary precaution; consequently the soil is polluted, and from data supplied to me by physicians in the interior I know that certain districts are badly infected and the disease is common and widely distributed."

3. **Preventive measures.**—Mr. Dawson reports on this point: "The government has taken no notice of the disease, nor have any steps, either private or public, been taken to alleviate or eradicate it. In fact little attention has been paid to its diagnosis among those seeking medical treatment for obscure cases of pernicious anemia. The fact that a few foreigners were unsuccessfully treated for anemia and later treated for hookworm disease in the United States and entirely cured has called the attention of physicians to the necessity of correctly diagnosing the case."

JAMAICA.

1. **Distribution of the infection.**—The superintending medical officer of the colony reports that: "Hookworm disease does exist in Jamaica. It has been reported as existing in the following parishes or parts thereof during the last financial year: St. Andrew, St. Thomas, St. Anns, St. James, St. Elizabeth, Portland, Westmoreland, Clarendon. It is found chiefly among East Indians, although also to some extent among creoles; of some 230 cases reported in one district nearly 100 were among East Indians."

2. **Degree of infection.**—The population of Jamaica is estimated to be about 862,000, of whom about 15,000 are whites, 16,000 East Indian coolies, 150,000 "colored," 5,000 not classified, and the rest negroes. Of the East Indian coolies it is estimated that about 50 per cent are infected. The new arrivals bring the disease with them from India.

3. **Relief measures.**—The superintending medical officer reports: "An order has been issued that as a routine practice all admissions to hospitals whose symptoms are at all suggestive of hookworm disease shall be treated therefor. I may say that the Malaria Commission, of which I am a member, is now collecting reports with a view to consider what measures can be taken to alleviate, reduce, or eradicate the disease." All coolies suffering from any disease are given free treatment in government hospitals.

MARTINIQUE.

1. **Distribution of the infection.**—The Director of the Health Service at Martinique reports: "The disease is prevalent throughout the country, especially in localities where

the people drink water from certain ponds." The parasite found is *Necator americanus*.

2. **Degree of infection.**—No information available. Thomas R. Wallace, American Consul at Fort-de-France, writes: "The inhabitants of Martinique are just beginning to be informed of the existence of hookworm and the conditions resulting from its infection."

3. **What is being done to eradicate the disease.**—

(1) The officials of the Health Service are spreading information on the subject by means of printed matter and by public meetings in the country.

(2) Regulations have been issued controlling the disposition of night soil.

(3) In 1909 a Hygiene and Microbiology Institute was established for the free treatment of transmissible diseases.

MEXICO.

1. **Distribution of infection.**—Dr. J. W. Colbert, of the Santa Fé Hospital, New Mexico, reports: "I have made an extensive study of this condition in Mexico, and have found the infection in the states of Lower California, Sinaloa, Queretaro, Guanajuato, Michoacan, Chiapas, Vera Cruz, Guerrero, Oaxaca, and Yucatan." Dr. Ricardoe Manuel, of Mexico, reports infections in Hidalgo, Tamaulipás, Guerrero, Michoacan, Zacatecas, and Guanajuato. Dr. W. C. Alvarez, of Cananea, Sonora, Mexico, confirms these reports as follows: "So far, cases have been reported from almost all the most southern Mexican states from the Isthmus of Tehuantepec and Yucatan to the states just above the City of Mexico. No case has yet been reported from

the immense northern states of Coahuila, Chihuahua, Sonora, and Durango. As these states have a more temperate climate and severe winter, owing to their great altitude above sea-level, the hookworm may never get hold on the higher plateaus."

2. **Degree of infection.**—Dr. Alvarez reports the disease as "very prevalent in the mines of Santa Rosalia, Lower California, and says the whole west coast appears to be heavily infected. Dr. Colbert reports: "I have examined a group of 114 Mexican laborers just received for section work on the Santa Fé Railway, and I found 13 of the men infected with hookworm." Dr. Luis R. Larú estimates infection in the mines of the Real del Monte and Pachuca at 50 per cent.

3. **Origin and spread of the infection.**—Dr. Manuel finds that "all the worms observed so far in Mexico are of the old-world type," and believes that the infection was introduced by foreign miners and has spread by the floating mining population. Dr. Colbert, on reporting finding 13 infected persons in a squad of 114 Mexican laborers, says: "I was informed that between two and three hundred of these men were received in El Paso every day for work on the various railroads of the country, and I believe that these Mexican laborers are responsible for the many cases coming to our notice throughout the West, the Middle West, and Southwest."

4. **Relief measures.**—Dr. Alvarez writes: "Nothing at all is being done, and, unfortunately, there seems to be no recognition of the disease by the local physicians, who for the main part are very poorly educated, and none that I have met use microscopes."

Reports from the public health authorities in many of the States indicate that there is but little local knowledge of the disease.

NICARAGUA.

1. **Prevalence of infection.**—Dr. M. S. Lane, graduate of a medical school in Ontario, Canada, and a practicing physician in Bluefields, reports: "This coast, or the Department of Bluefields, is certainly infected. Referring to my notes, I find I have attended the following cases: 6 cases from Cape Gracias and district; 7 cases from Prinzupulcu and district; 13 cases from Rio Grande and mahogany camps; 27 cases from Pearl Lagoon district; 110 cases from the town of Bluefields—part of these lived here; some came from banana plantations on Escondido River, Cukra district, and Rama Cay. My cases have been all from agricultural districts."

2. **Degree of infection.**—On this point he says: "I am unable to answer this question intelligently, not having the proper data, but I should judge that the percentage of cases is small."

3. **Relief measures.**—"Only what the individual physicians of Bluefields do in treating individual cases and advising as to sanitation and prophylaxis. There is no health board here."

PANAMA.

1. **Distribution of infection.**—The infection is general throughout the Republic of Panama. Prevalent among agricultural classes and natives in general; both the new-world and the old-world species present.

2. **Degree of infection.**—Alban G. Snyder, Consul General at Panama, reports: "Infection general and to the approximate degree of 20 per cent."

3. **What is being done to alleviate or eradicate it.**—The cases which come to the hospital are being treated. Beyond this nothing is being done by public or private agencies.

PARAGUAY.

1. **Prevalence of hookworm infection.**—The following letter addressed to Cornelius Ferris, American Consul at Asuncion, gives our only available information on the subject:

"In fulfillment of my promise this afternoon, I beg to confirm the information which I gave you, that hookworm disease is very prevalent in this country. Since 1865, when the tyrant, Solano Lopez, commenced the war which lasted until March, 1870, the whole population had been living in a state of semi-starvation. The survivors of that great calamity continued to die off, as during the latter years of the war, from diarrhea, attributed ignorantly by us to the mere want of a healthy food, without suspecting the existence of a parasite in the bowels, until 1880, when it was shown in an epidemic among the workmen in the St. Gothard tunnel to be caused by the hookworm or *Ancylostoma*.

* * * With regard to parasitic worms and disease-bearing protozoa our field is still unexplored, but if American investigators, who rank in the first line today, could be induced to come with the text of St. Luke 10: 1 to 16, they would return again with joy like those 70 gospel messengers.

"Yours sincerely,

WM. STEWART, M. D."

2. **Preventive measures.**—Mr. Ferris reports: "Nothing is being done to alleviate or eradicate the disease."

PERU.

1. **Distribution of the infection.**—Dr. J. C. Gutierrez, Acting Assistant Surgeon, U. S. Public Health and Marine Hospital Service at Calao, Peru, reports: "Peru is infected with hookworm disease. The territory of Peru is divided into three zones—the Coast, the Sierra or Cordillera, and the Montana or forest region. The latter is the sole region recognized as infected. This zone extends from the slopes of the Cordilleras as far as the frontier of Brazil and Bolivia, and represents close upon two-thirds of the total surface of Peru; the population may be set down as 450,000 inhabitants. At Iquitos there are many cases of hookworm disease. * * * The infection is known only among the agricultural classes. Among the workers in the mines are seen some cases, * * * but all of them have visited the Montana region, so that it is not possible to ascertain if the patients became infected while working in the mines."

2. **Degree of infection.**—Dr. Gutierrez reports: "Thirty per cent of the poor in the Montana region are infected with hookworm disease. Among the people of the better class cases are rare."

3. **Relief measures.**—The same report continues: "Nothing is being done by public or private means to alleviate or eradicate the disease."

PORTO RICO.

1. **Distribution of infection.**—When the Porto Rico Anemia Commission, established as a result of Ashford's earlier investigations, took up its work in 1904 it was found that hookworm infection was present over the whole island; infection was heaviest on the coffee plantations in the mountain regions. The parasite found in Porto Rico is *Necator americanus*.

2. **Degree of infection.**—The population of the island was in 1904 about 1,000,000; it was estimated that about 800,000 of these were infected; that among the workers on coffee plantations infection would run as high as 90 per cent.

3. **Conditions favoring spread of infection.**—The climate is tropical; the rainfall abundant; with the exception of a brief season, the ground under the coffee trees is rarely ever dry; the jibaro pollutes the soil around his hut; this soil is covered with a mulch of decaying leaves and is shaded by banana plants and coffee trees; the jibaro goes barefooted the year round and throughout life; the children under 6 years old usually go unclothed.

4. **Relief measures.**—The Porto Rico Anemia Commission began systematic work in 1904; since that time more than 300,000 Porto Ricans have been treated. Treatment is given free at anæmia dispensaries, which are maintained at convenient points over the island; instruction in sanitary measures is given to the people as they are treated and is given to the children in the schools. The Porto Rican government is this year (1911) expending \$50,000 for the maintenance of the work.

NOTE.—The laborate reports of the Porto Rico Anemia Commission make it unnecessary to give here a detailed account of the work.

SALVADOR.

1. **Distribution of infection.**—The first case of hookworm disease reported in Salvador was discovered by Dr. H. Prowe in 1887. In 1889 Dr. Prowe reports that he has seen hundreds of cases in Salvador; that it is heaviest among the coast Cordilleras and in the central portion; that the east and west sections of the country are for the most part free.* Harold D. Clum, Vice Consul General at San Salvador, reports: "The Hospital Rosales, in San Salvador, is the only place in this Republic where the disease has been observed and from which it has been possible to obtain any data regarding the degree or spread of the infection. * * * From 1903 to the present year (1911), 1,482 examinations have been made in the Laboratory of Biological Chemistry in this institution. * * * Among the patients found to be suffering from hookworm disease there were persons from all of the fourteen departments and practically all of the principal towns and cities, as well as many of the smaller villages of the Republic, from which it is evident that the infection extends over the entire country." He reports infection as heaviest among agricultural day laborers; as present also among miners, masons, and bricklayers.

2. **Degree of infection.**—Our present knowledge is not sufficient to justify a statement of the degree of infection in percentages. Dr. Prowe examined at Hospital Rosales 112

* Arch. f. path. Anat. [etc.], Berl., 1899, v. 7 (3), pp. 458-474.

persons, 65 of whom he found infected. Of 1,482 examinations made at the laboratory of this institution from 1903 to 1911 infection was found in more than 30 per cent of the cases.

3. **Relief measures.**—Mr. Clum reports that no measures have been adopted by public or private agencies to alleviate or eradicate the disease; that it has not been regarded as meriting special attention; that comparatively few physicians of the country are acquainted with it.*

SURINAM, OR DUTCH GUIANA.

1. **Distribution of infection.**—Dr. E. A. Koch, medical inspector for the colony at Paramaribo reports that hookworm infection is spread over the whole of the colony; that it is especially prevalent wherever immigrants are collected in large settlements. The labor on the plantations is composed mainly of immigrants from India and Java. This immigration has brought a steady stream of infection into the country.

2. **Degree of infection.**—An estimate of the degree of infection for every infected area has not been made, but many plantations have been found on which the infection runs as high as 90 per cent.

3. **Relief measures.**—For the eradication of the disease the following measures have been adopted:

a. Sanitary privies have been provided for British Indian and Netherland Indian immigrants.

* Mr. Clum derives his information from Dr. Pedro A. Villacorta, in charge of the Section of Demographic Statistics of the Superior Board of Health of Salvador, and from Dr. José C. Gastéazoro, a practising physician of the city.

b. A law has been enacted against soil pollution along the roads and on the plantations.

c. The distribution of popular literature in the Hindostanese and Javanese tongues.

d. Treatment in plantation hospitals of all those who are infected, together with periodical examinations of those who are suspected of being infected. The treatment given is as follows: A purgative in the evening; on the following morning four to six grains of thymol in pills, followed a few hours later by another purgative.

TRINIDAD.

1. **Distribution of the infection.**—Franklin D. Hale, American Consul at Trinidad, reports: "All over the island. The infection is agricultural."

2. **Degree of infection.**—Of 25,055 cases of sickness treated at estate hospitals during the year 1909, 994 were classified under the head of hookworm disease, as against 121 cases for the year 1907.

3. **What is being done to eradicate the disease.**—Nothing is being done by the government; no decisive action has been taken by any private agency. Cases are being treated in estate hospitals. The Agricultural Society at its meeting, June, 1910, appointed Dr. Nasson a committee of one to investigate and report on the disease.

VENEZUELA.

1. **Distribution of infection.**—Physicians at Maracaibo report infection in the region south of Lake Maracaibo; Herbert R. Wright, at Puerto Cabello, reports that consular

district as infected; Isaac A. Manning, American Consul at La Guayra, advises that no study has been made of the geographical distribution of hookworm disease in Venezuela; that a leading physician in Caracas reports having knowledge of the general presence of infection throughout the country. Dr. Louis Razetti, of Caracas, advises that at the meeting of the National Congress of Medicine next June there will be a report from each state as to general distribution of hookworm infection.

2. **Degree of infection.**—No accurate data for an approximate estimate. At San Esteban, a village about ten kilometers from Puerto Cabello, the infection is reported as extending to "a great part of its inhabitants."

3. **What is being done to eradicate the disease.**—Some physicians are treating cases in their private practice. It is expected that the report from the states at the meeting of the National Congress of Medicine next June will be the beginning of some concerted action for the eradication of the disease. Beyond this nothing is being done.

III. ASIA.

BAGDAD, TURKISH PROVINCE OF.

1. **Prevalence of infection.**—Mr. Leonard, American Vice and Deputy Consul at Bagdad, reports: "The Turkish Province of Bagdad is infected with hookworm, but the geographical distribution of the infection within the country is unknown. * * * The infection is agricultural."

2. **Degree of infection.**—The report estimates the degree of infection at about 10 per cent.

3. **Preventive measures.**—Nothing is being done by private or public agencies to alleviate or eradicate the disease.

CEYLON.

1. **Infection.**—Both *Ancylostoma duodenale* and *Necator americanus* are found in Ceylon. The infection covers practically the whole of the planting districts where Tamil labor is used; it involves also the Sinhalese villages on the confines of the planting districts. The disease is more prevalent on the estates situated in the "low country."

2. **Degree of infection.**—Badly infected estates may have the labor force infected to the amount of 90 per cent. The committee appointed by the Colonial Secretary to consider measures to prevent the spread of hookworm disease in the island recommends that all superintendents of estates treat all new arrivals with beta-naphthol. "The ground for this recommendation," says the report, "is that the percentage of coolies arriving in the island who are suffering from this

disease in a more or less marked degree is so high that the disease may be said to be practically universal." The committee also recommends the treatment of the whole labor force on infected estates.

3. **Infection agricultural.**—The infection is confined practically to those who follow agricultural pursuits. The number of persons working in mines is very small; the presence of infection among them has not been ascertained; evidence of the symptoms of the disease among them is absent.

4. **Origin and spread of the infection.**—It is not known whether the native population of the island was originally infected; it seems to have been at least relatively free from it. Most of it certainly has been brought into the island by the importation of coolie laborers from South India. On March 17, 1910, the Colonial Secretary writes to the chairman of the Planters' Association: "I am directed by the Governor to inform you that it has lately come to the notice of the government that not only is ancylostomiasis [hookworm disease] on the increase in Ceylon, but that in districts where Sinhalese labor is employed upon estates the disease is showing a tendency to spread to the native population of the island, who hitherto have for the most part been free from it. Recent investigations, as you are aware, have also disclosed the fact that a considerable percentage of the immigrant coolies landing in Ceylon for employment upon the estates are already on arrival infected by the disease."

5. **Conditions which favor the spread of the disease.**—The climate of Ceylon is warm and moist; the coolies on

the estates are massed in "lines;" the lines are not provided with latrines, and the planters contend that the coolies cannot be made to use the latrines even when they are provided; the habits of the coolies are to befoul the soil about the lines and on the estates where they work; their feet and legs are not protected from contact with the polluted soil.

6. **What is being done to alleviate or eradicate the disease.**—On February 4, 1909, the English Government sent to the Governor of Ceylon the following dispatch:

The Right Hon. the Earl of Crewe, K. G., to Governor Sir H. E. McCallum, G. C. M. M., A. D. C. Ceylon. No. 53.

DOWNING STREET, *February 4, 1909.*

SIR: I have the honor to inform you that a committee has been sitting at this office to consider what measures could be recommended for the prevention of ancylostomiasis in the colonies affected by that disease.

2. This committee has been presided over by Sir Patrick Manson, and has numbered amongst its members Professor J. S. Haldane, F. R. S., who some years ago was commissioned to report to the Home Secretary on the prevalence of ancylostomiasis in the Cornish mines.

3. Reports on the existence and treatment of ancylostomiasis have been obtained from a large number of colonies and have been laid before the committee, who have also taken verbal evidence from a number of medical officers and others who have had experience of the disease.

4. I have now been furnished with a copy of the report of the committee, and in this dispatch I propose to summarize the conclusions at which I have arrived after perusing it.

5. Having considered the reports from the several colonies, with the observations of the committee upon them, I recognize that the loss of labor caused by the prevalence of ancylostomiasis is very serious, and affects prejudicially not only the employers of labor, but the community at large. Not only is there serious loss of life, direct and indirect, but also through the invaliding of laborers the charges for hospitals and pauper expenditure are largely increased. This loss is, in my opinion, largely avoidable. Experience has shown that certain simple, well-understood, and inexpensive measures can be adopted, which, if properly carried out, will reduce the evil effects of anchylostomiasis to a negligible quantity.

6. I think that the colonial authorities have been inclined to exaggerate the difficulties of dealing with this question. They have argued that the complete eradication of ancylostomiasis is impracticable, and that the cost of preventive measures is prohibitive; and they have been content, with a few commendable exceptions, to do nothing in the matter.

7. It cannot be too clearly understood, however, that, provided that reasonable precautions are taken to prevent the constant reinfection of the laborers, the presence of a small number of anchylostomiasis, even in a large proportion of the population, may have no appreciable effect. Moreover, no elaborate sanitary appliances are necessary to guard against reinfection on a large scale. For example, latrine accommodation on estates is, I am advised, sufficiently subserved by a hole or trench cut in the ground, provided that the contents are covered with earth from time to time. If it is insured that this accommodation will be used by a

majority of the laborers, the fact that isolated cases of fouling of the soil cannot be prevented is not of material importance. The main point is to guard against the fouling of the soil in places where, from the condition of the soil and the presence of numbers of laborers, it is clear that danger is to be apprehended.

8. In these circumstances I think that no hardship can be involved in compelling estate owners, local bodies, and private persons to take such reasonable precautions as experience has shown will minimize the constant drain on the resources of the community which the existing state of affairs involves.

9. I therefore recommend, for your very careful consideration, that—

a. Wherever necessary, laws should be enacted enforcing the provision on estates and elsewhere that numbers of laborers are collected of simple, inexpensive, but efficient, latrines, in places appropriate both as regards the convenience of the laborers and the health of the public.

b. A penalty should be imposed on persons found avoidably defecating in any place where contamination of the soil or water would be likely to cause risk of infection.

c. Each colony should be divided into convenient districts, in each of which should be appointed an inspector responsible to the local authority, medical officer, or some other authority, who should be charged with the enforcement of sanitary regulations.

d. In all schools object lessons on ancylostomiasis should, as far as possible, be given. Leaflets containing simple information on the subject should be distributed periodically. The committee consider that the pamphlet

prepared by Dr. Nicholls, of the Leeward Islands, would form a suitable model.

e. While the treatment for ancylostomiasis of the whole population is clearly impracticable, arrangements should be made for the distribution from convenient centers, such as schools, post-offices, district nurse stations, etc., of anthelmintics at cost price, with simple directions for use. For this purpose beta-naphthol is the most suitable drug, thymol and other toxic anthelmintics being used only under medical supervision.

10. It has further been suggested that an inspector-general should be appointed, his salary being divided amongst the several colonies concerned, whose duty it would be to supervise the measures taken for the eradication of ancylostomiasis and to distribute advice and information. The appointment would, it is suggested, be purely temporary in the first instance. While I shall be glad if you will place this suggestion before the Legislature, if a convenient opportunity should occur, and invite their observations upon it, I wish it to be clearly understood that discussion of this proposal should not be allowed to interfere with the carrying out of the measures which I have advocated above. The appointment of such an officer would, I recognize, involve financial and constitutional questions of some complexity; and I do not wish that the execution of the more immediately practicable measures for the eradication of ancylostomiasis should be deferred pending the discussion of these questions.

11. I enclose a short memorandum in which the reports received from the several colonies concerned were summarized for the purpose of the committee. Should you desire to obtain further information in regard to any of

the measures referred to in this memorandum I shall be glad to supply you with a copy of any particular report.

12. I request that you will inform me in due course what additional measures for the prevention of ancylostomiasis you propose to take in pursuance of the recommendations made in this dispatch, and that you will include annually in the medical report some account of the progress of those measures.

13. A dispatch in identical terms is being addressed to the Governors of the West Indian Colonies, with the exception of those in which the disease is reported to be unknown.

I have, etc.

CREWE.

On May 26, 1910, the Governor of Ceylon appointed a committee to report on measures for the prevention of the spread of the disease. On the 24th of August, 1910, this committee submitted the following report:

SIR: In reply to your letter of May 26 last, appointing us a committee to consider and advise as to the measures to be taken to prevent the spread of ancylostomiasis in the Island, we have the honor to submit the following report.

2. The committee met in Kandy and in Colombo, and examined witnesses both medical and planting. We also received replies to a series of questions which we addressed to gentlemen who were likely to be able to give useful information to the committee on the subject. The evidence and the written answers to the questions which were asked are attached as appendices to this report.

3. The conclusions at which we have arrived on the evidence that has been brought before us are summarized in the following recommendations:

(1) That all superintendents of estates should treat new arrivals with beta-naphthol, followed by tonics; particulars of the course of treatment recommended by the Principal Civil Medical Officer according to the age of the laborer are annexed. The ground for this recommendation is that the percentage of coolies arriving in the Island who are suffering from this disease in a more or less marked degree is so high that the disease may be said to be practically universal. In the rare cases where it does not occur the treatment will not be injurious.

(2) Where it is known that ancylostomiasis already prevails on estates, superintendents should treat the whole labor force in convenient batches in a similar manner. We have ascertained that coolies do not object to the treatment, which can be carried out without greatly interfering with the labor force.

(3) When any case of ancylostomiasis occurs amongst laborers admitted to hospital, the medical officer should notify the employer. This is for the purpose of informing the superintendents who may previously have been in ignorance of the existence of the disease on their estates, in order to enable them to take action forthwith.

(4) The drugs required for the treatment should be issued at cost price from the Civil Medical Stores. Where estates have dispensaries and are therefore allowed a small sum per cooly for medicines, we recommend that the drugs required for the beta-naphthol treatment may be used for Singhalese as well as Tamil laborers up to the limit of the present capitation grant for free drugs for Tamil coolies. Under existing conditions employers have to certify that medicines have been used for their Tamil coolies only, and any drugs required for Singhalese laborers have to be paid for, even though the limit allowed for free medicines has

not been reached. It is highly desirable that facilities for treating Singhalese should be granted, as otherwise they may be the means of introducing the disease into their villages, where it has hitherto been almost unknown.

(5) Medical officers in charge of districts should report to the Principal Civil Medical Officer, through their immediate superiors, the prevalence of anchylostomiasis in a severe form on any estate. In such cases the Principal Civil Medical Officer should be empowered to send an officer of his Department to inspect, report, and make recommendations for combating the disease. If the Principal Civil Medical Officer approves these recommendations, they should be communicated to the superintendent with a view to their adoption. Where these recommendations have not been carried out at the end of three months, Government shall be empowered to enforce the Principal Civil Medical Officer's recommendations at the expense of the estate.

(6) With regard to the question of the improvement of sanitation on estates, we recommend that every set of lines and its immediate surroundings should be cleaned and swept once every day. All sweepings should be burnt or buried. The evidence tended to show that more line sweepers should be employed. At least 12 feet clear of all vegetation must be maintained round the lines. Stone, brick rendered in cement, or cement concrete drains should be constructed to carry off rain from the roofs and from the immediate vicinity of the lines. The immediate vicinity of the lines should be on a lower level than the floor of the lines and slope downwards from them, with the object of keeping the ground surrounding the lines as dry as possible, as the hookworm flourishes in damp earth. All excreta deposited within 50 feet of the lines should be removed daily and buried by the sweeper.

(7) At all bathing places, whether at spouts, wells, or riverside, there should be stone or paved platforms with a properly constructed run-off drain where necessary. This is with the object of preventing the reinfection of coolies through the feet when standing on damp earth. Wells for bathing and wells for drinking water should be kept separate.

(8) To prevent the contamination of the water supply for drinking purposes, closed iron piping is strongly recommended. Open coffee spouting should be condemned. Wells should be lined with brick pointed with cement and have parapet walls, and a surrounding platform 4 feet wide of stone paving, cement concrete, or brick cement rendered, and a surrounding drain to conduct the waste water away. Wells for domestic and drinking purposes should be covered and provided with a pump.

(9) Whilst recognizing the great importance of latrines on estates, we are forced to the conclusion from the evidence given that it is not at present advisable to recommend their general compulsory adoption, but we would urge on all employers of labor the desirability of establishing them especially for bungalow coolies, factory coolies, school children, and Public Works Department lines.

(10) The attention of agents, visiting agents, and managers of estates should be invited to the recommendations of the committee, and they should be especially requested to do all in their power to give effect to them.

(11) The question of the segregation of newly-arrived coolies has had our careful consideration, but we do not consider that it would be practicable. Great delay would be involved thereby, and the recommendation of the general treatment of all new coolies should, in our opinion, fully suffice.

4. The committee are confident that the adoption of the measures which have been recommended above will prevent the spread of the disease without disorganizing the labor force of the Island, and without involving much unnecessary cost to the employers of labor.

We have, etc.

H. L. CRAWFORD.

W. H. JACKSON.

ALLAN PERRY, M. D.

JOSEPH C. DUNBAR.

F. H. LAYARD.

HERBERT K. HILLYER, *Sec'y.*

AUGUST 24, 1910.

Under date of June 7, 1911, Dr. Perry of this committee advise that: leaflets have been sent to employers of immigrant labor; special superintending medical officers are to be engaged to report on the sanitary condition of estates with particular reference to hookworm infection and disease. A legislative enactment has been drafted to be presented to the Legislative Council at an early date.

CHINA.

I. Prevalence of the infection.—I. Swatow District. The Swatow District comprises the northeastern portion of Kuangtung Province. Population seven or eight millions. Occupation agricultural.

(1) Distribution of infection.—Infection throughout the district; most severe among the farmers.

(2) Degree of infection.—Dr. G. Duncan Whyte of the English Presbyterian Mission places the infection for the

whole population at 54 per cent; for the farming population at 74.5 per cent. Estimate made on basis of microscopic examination made at hospital.

2. **Ngan-hoe Province.**—(1) **Distribution of infection.** Wilbur T. Gracey, American Consul at Nanking, reports: "This infection is generally distributed throughout the rice farming and gardening areas of the Yangtze River valley, to the definite knowledge of American physicians resident here."

(2) **Degree of infection.**—Mr. Gracey states that of 500 persons recently examined 24.6 per cent were infected; of this 500 only about one-half were farmers. For a group of 51 farmers recently examined the percentage of infection is 72.8; for another group of 40 farmers the infection is 76 per cent.

3. **Chekiang and Kiangsu Provinces.**—This report covers the whole of Chekiang Province and that part of Kiangsu Province south of the Yangtze River and east of 119 degrees east longitude.

(1) **Distribution of the infection.**—Amos P. Wilder, American Consul at Shanghai, writes: "I have obtained the opinions of foreign doctors in many parts of this district and in every case the reply is definitely made that infection exists throughout the district."

(2) **Degree of infection.**—There has not been enough investigation to give a basis for an approximate estimate of the degree of infection; some of the doctors on basis of general observation place it at from 5 per cent in the cities to 25 per cent among farmers. One doctor who has made many examinations of *fæces* reports about one out of every ten infected.

4. **Sze-Chuen Province.**—(1) **Distribution of infection.**—Albert W. Pontius, American Consul at Choong-king, reports: "The existence of hookworm infection is universal throughout the Province, and is fairly evenly distributed."

(2) **Degree of infection.**—Consul Pontius reports: "Out of 1,000 examinations in the M. E. Mission Hospital for Men, 445 had hookworm infection, while only 2 were infected among 25 women examined in the mission's women's hospital. The infection is nearly 100 per cent among the agricultural workers."

5. **Hoo-Pe Province.**—(1) **Distribution of infection.**—R. B. Mosher, American Consul at Hangkow, reports: "The parasite has been found by nearly all investigators who have systematically looked for it in many mission hospitals throughout Central China. Chiefly *Ancylostoma*, but *Necator* has also been identified."

(2) **Degree of infection.**—Statistics not sufficient for more definite statement than that the infection is heavy.

6. **China as a whole.**—In 1907 the Medical Missionary Association of China organized a department for systematic research to be conducted for three years; during this period reports were sent in from practically all provinces; the results are summarized in "Diseases of China", by Jefferys and Maxwell, 1910. Of hookworm disease the authors say:

1. That we owe our knowledge of the disease in China to the Medical Missionary Association.

2. That it is one of the most serious factors of disease in the Empire.

3. That the infection is extremely wide-spread throughout the Southern two-thirds of China.

4. That, "excluding the four most northern provinces of Kansoo, Shense, Shanse, and Chili, from which reports are wanting or incomplete, we can confidently affirm that the other 14 provinces are widely infected, the rule being that the further South one travels the more severe the infection. It is also reported as fairly common from Korea, and is extremely frequent in Formosa, 44 per cent, in a series of 1,000 male patients."

II. Conditions which favor the spread of the disease in China.—All reports show the infection to be most severe among agricultural workers. Dr. Beebe, an eminent medical authority of the Nanking district, attributes this condition to the fact that the Chinese farmers use human fæces for fertilizer; irrigate growing vegetables with pond water and fæces; and work in the wet soil with bare feet and legs, thus giving opportunity for the larvæ to enter through both the skin and the mouth.

III. What is being done to alleviate or eradicate the disease.—From all these infected provinces the reports come with one voice:

1. That all mission hospitals are examining and treating all cases that come under their care.

2. That nothing is being done by the Chinese Government or the Chinese to alleviate or eradicate the disease.

The reports call attention to certain difficulties in the way of giving aid on a large scale:

1. "Private agencies would have but a poor opportunity of doing any effective work without the support of the authorities."

2. "No systematic attempts are being made to eradicate the disease; and owing to the universal employment of

liquid manure from night-soil by the agricultural and gardening population, it would appear to be a difficult problem."

COCHIN CHINA.

1. **Distribution of infection.**—Dr. F. Noc, military physician, Pasteur Institute of Saigon, conducted a series of investigations covering two years from 1906 to 1908, with a view to discovering the connection, if any, between the very prevalent disease of beriberi and hookworm infection. He reports* that of 77 cases of beriberi examined in 1906, 74 carried hookworm infection; that of 211 cases of beriberi, all have had hookworm infection; that in these investigations he demonstrated hookworm infection in 2,326 cases; that his investigations have demonstrated that there is an intimate relation between beriberi and hookworm disease, and that hookworm infection is extremely prevalent among the Asiatics of Cochin China. Both *Ancylostoma duodenale* and *Necator americanus* are present; *Necator* is the prevailing type.

2. **Degree of infection.**—It is not possible on the basis of data at present available to state the degree of infection in terms of percentages. The records of Dr. Noc would seem to show, and his report repeats with emphasis, that infection is *extremely prevalent* among the Asiatics of Cochin China.

3. **Causes favoring the spread of infection.**—In addition to the tropical temperature and a high degree of humidity, Dr. Noc states that the natives go barefooted and are extremely careless as to soil pollution.

* Ann. de l'Inst. Pasteur, Paris, 1908, v. 22 (11), 896-916, 956.

4. Relief measures.—No report on this subject.

INDIA.

1. **Distribution of infection.**—The entire area of India seems to be infected with hookworm. It is most prevalent in Bengal, Eastern Bengal and Assam. Infection is heavy among the Tamils of Southern India. Both the old and the new world species are present.

2. **Degree of infection.**—It is estimated that from 60 to 80 per cent of the inhabitants of India harbor the worm to a greater or less extent (C. P. Lukis, Surgeon General I. M. S.).

In 1903, Surgeon Major Edwin Dobson, at Dhubri, Assam, selected for examination 547 of the more healthy looking immigrant coolies from all parts of India. Of the 547 examined 454 were infected. His record of hundreds of examinations of prisoners, immigrants, patients in hospitals, laborers in various occupations shows the infection to range from 60 to 80 per cent and to be spread over all parts of India. (Indian Medical Gazette, 1892, 1893, 1900, 1904, 1906.)

The Government Medical Inspector for British Guiana reports that of the Indian immigrants to that country for the year 1909, 74.44 per cent were infected. A shipload of Indian coolies just arrived at Durban, Natal, in 1908, showed on examination an infection of 93 per cent. Dr. C. A. Bently reports finding in Assam only one cooly out of 600 who did not show infection. Dr. Dobson found 75 per cent infection among the newly arrived coolies at Dhubri.

3. **India a center of infection.**—From the Indian Peninsula a constant stream of infection is going into Assam, Ceylon, Southeast Africa, British Guiana, Dutch Guiana, Jamaica, and all countries that are importing cooly labor.

4. **Conditions which have favored its spread in India.**—High temperature, extreme moisture, shade; a dense population, the habit of polluting the soil universal and persistent, feet and limbs unprotected the year round.

5. **What is being done to alleviate or eradicate the disease.**—A considerable amount of work has been done by medical officers in India; the results of their investigations have been published in the Indian Medical Gazette and the British Medical Journal. In 1890 the Government had made a special report on Kala Azar and Beriberi in Assam and in 1897 a report on epidemic malarial fever in Assam, both of which involved the subject of hookworm disease. Under date of June 15, 1911, Surgeon General C. P. Lukis writes: "From these papers it will appear that from 60 to 80 per cent of the inhabitants of this country harbor the worm to a greater or less extent. * * * I have at present no information available as to the work being done by public or private agencies to eradicate the disease beyond the extension of sanitary measures for the prevention of faecal contamination of the soil, the protection of the feet and the treatment with thymol, the eucalyptus oil mixture, or beta-naphthol, of such patients who may attend hospital." The American Vice Consul, C. B. Perry, writing under the same date, says: "Nothing is being done by Governmental agencies to alleviate or eradicate the disease except the usual sanitary measures for the prevention of faecal contamination of the soil and hospital treatment of incapacitated

patients. * * * The conclusion that I have arrived at is that although widely prevalent in India, the disease is not considered of a dangerous nature and no special steps have been deemed necessary as yet to combat it."

JAPAN.

1. **Distribution of the infection.**—Surgeon Fairfax Irwin, of the U. S. Public Health and Marine-Hospital Service at Yokohama, reports that the infection is present to a greater or less extent in every prefecture of Japan; that the infection is present both in mines and on the surface; that it is most frequent among farmers. Special local reports definitely locate infection in the following prefectures:

1. Kyoto Fu.—The disease found in almost every part of the prefecture.
2. Shiga Ken.—Only a few isolated cases in remote parts of the prefecture.
3. Naru Ken.—Number of cases not very many, but disease is spreading.
4. Kochi Ken.—770 cases reported for 1910.
5. Gifu Ken.—Infection in some parts of prefecture among agricultural workers.
6. Toyama.—Disease held in check by preventive measures.
7. Nagano Ken.—In 1909, there were 1,843 deaths from the disease; for 1910 the deaths number 1,893.
8. Ishikawa.—Badly infected; deaths in 1910 due to this cause 1,325.
9. Shidzuoka.—From 1907 to 1909, reported 8,419 sufferers from this disease.
10. Akita.—Infection not heavy.
11. Aomori.—Disease exists; under investigation.
12. Ibaraki.—Few cases observed.

13. Niigata.—Infection light.
14. Tochigi.—Infection light.
15. Osaka-fu.—Isolated cases.
16. Hyogo Ken.—Cases among farmers and some in mines.
17. Wakayama Ken.—1,130 cases reported for 1910.
18. Hiroshima Ken.—Cases observed in all the counties.
19. Tottosi Ken.—Disease found in every part of the prefecture.
20. Shimane Ken.—Isolated cases in every part of the prefecture.
21. Okayama Ken.—Disease found in every part of the prefecture.
22. Yamaguchi Ken.—Disease present in every part of prefecture; cases reported for 1909, 482.
23. Kanagawa.—Disease believed to be limited to miners and agriculturists.

The following tabular statement from report for the prefecture of Yamaguchi is instructive:

Number of Cases of Hookworm by Occupation.

Occupation.	1907.		1908.		1909.	
	Male.	Female.	Male.	Female.	Male.	Female.
Government or public service.....	11	...	22	2	23	...
Scientific	35	8	47	24	37	32
Medical .....	...	...	1	...	...	...
Agricultural	140	81	201	103	155	95
Commercial	40	33	47	34	45	20
Manufactural	5	1	9	0	4	2
Fishing .....	...	...	...	...	...	1
Shipping	2	1	...	...	2	...
Mining .....	...	...	1	...	...	...
Laborers	6	...	5	...	4	...
All others	19	32	21	48	15	48
	—	—	—	—	—	—
	258	156	354	211	285	198

2. **Degree of infection.**—Lack of systematic investigation makes it impossible to approximate the degree of infection. From the prefecture of Tosa 770 cases are reported for 1910; Nara-ken reports an estimated infection of about 5 per cent of the population. The fact that infection is present in every prefecture would indicate a heavy infection in localities where conditions are most favorable. Rice growing in the absence of strict sanitary regulations would seem to supply conditions for a heavy infection. The following exhibit is a rough index to the prevalence of the disease:

Number of Cases of Hookworm by Cities and Counties.

City or county.	1907.			1908.			1909.		
	Male.	Fem.	Total.	Male.	Fem.	Total.	Male.	Fem.	Total.
Oshima	2	...	2	2	1	3	2	...	2
Kuga	4	3	7	6	3	9	12	9	21
Kumage ...	1	1	2	2	...	2	2	2	4
Tauno	7	3	10	8	4	12	10	6	16
Saba	11	6	17	16	8	24	14	10	24
Yoshiki	103	65	168	143	93	236	104	78	182
Asa	40	24	64	56	36	92	34	51	85
Toyo-ura ..	9	6	15	13	6	19	9	7	16
Mine	29	13	42	39	25	64	32	20	52
Shimonoseki	12	8	20	9	4	13	9	2	11
	218	129	347	294	179	474	228	185	415

3. **Relief measures.**—Dr. Irwin reports: "For the eradication of the disease some effort is being made. In Hyogo an attempt is being made to improve the general sanitary conditions by the construction of water closets and drains and improving the water supply. In some places lectures on the subject are being given." Some of the local reports state that persons found infected are being treated with

thymol. No comprehensive, systematic effort is being made.

JAVA.*

1. **Distribution of infection.**—Dr. J. J. Kunst, army physician at Ambarawa, Java, estimates that infection is very widespread throughout Java and the Archipelago.* Dr. A. J. Salm reports a series of investigations which demonstrate infection throughout Java and the Archipelago.† Javese immigrants on plantations in Dutch Guiana are found heavily infected.‡

2. **Degree of infection.**—The following investigations may serve as an index to the distribution and degree of infection:

(1) Dr. J. J. Kunst:

a. At Ambarawa, middle Java, demonstrated infection in a nine-year-old boy, European, who had lived in the country only eight months.

b. Examined 140 natives from villages throughout Ambarawa district; infected, 20 per cent.

(2) Dr. A. J. Salm reports:†

a. Dr. Erni in 1896 found that 67 per cent of the native employees on a tobacco plantation at Deli were infected; of these 10 per cent to 15 per cent were severely anemic.

b. Dr. Van Steeden at Sawah Loento in 1901 examined the convicts in the government mines to which are sent convicts from the whole Archipelago who are condemned to forced labor from five to twenty years. Of 52 examined

* Janus. Haarlem, 1910, v. 15, pp. 221 fol.

† Gaz. hebd. d. sc. méd. de Bordeaux, 1904, v. 25, p. 164.

‡ Dr. E. A. Koch, correspondence.

51 were infected. He concluded that the whole Archipelago was heavily infected.

c. Dr. Steiner at Soerabaia examined the prisoners who passed through that place on their return home. Examined, 11; found infected, 11. He found infected 24 convicts who had not worked in the mines.

d. Dr. Van der Meer, physician who succeeded Dr. Van Steeden at Sawah Loento: Examined, 273 convicts who had arrived there as miners; found infected, 254.

e. Dr. Benjamins at Samarang: Examined, all patients in his hospital, 100 in number; found infected, 70. Many of these were natives who had not worked in the mines.

f. Dr. Klaasen found infected 50 natives of Java who had just arrived from Borneo. Of these 2 were extreme cases; one had 20 per cent hemoglobin; the other 12 per cent hemoglobin.

3. **Relief measures.**—Dr. Van der Meer recommends the following measures for the mine operators:

1. Supply the mines with latrines.
2. Do not eat during working hours.
3. Provide lavatories above ground and have all workers on leaving the mines clean themselves.
4. In newly opened mines work only persons who are not infected.

For the general population Dr. Salm recommends that all people drink only pure water; that they avoid especially water of open streams. He is convinced that drinking impure water is the main source of infection; this on the ground that the natives by established custom defecate in running water.

KOREA.

1. **Distribution of infection.**—Dr. O. R. Anison, in charge of the Severance Hospital at Seoul, reports that the country is infected; that the full extent of the geographical distribution is not yet known; that his own judgment is that it is distributed throughout the whole country. Dr. Weir, of Chemulpo, reports finding infection in patients from all parts of the country.

2. **Degree of infection.**—Dr. Weir, who has examined the fæces of a large number of people sick and well with a view to discovering hookworm infection, says that 50 per cent of all cases examined were found infected with hookworm. Of all those infected, about 70 per cent were farmers.

3. **Preventive measures.**—The American Consul-General at Seoul, through whose efforts the above facts were secured, reports that no public measures have been adopted for the relief or prevention of the disease; that nothing has been done by private agencies save the treatment of cases that come to the doctors. The subject has been taken up by the Korean Medical Missionary Association.

MALAY STATES.

1. **Distribution of infection.**—Infection is prevalent over entire area of Federated Malay States. It seems heaviest among the Tamil laborers on rubber estates; found also among Javanese and Chinese laborers. The Tamils from India constitute three-fourths of the laborers on estates. Both *Necator americanus* and *Ancylostoma duodenale* are found.

2. **Degree of infection.**—Dr. W. L. Braddon, State

Surgeon at Seremban, reports: "I am able to affirm that it is *to one single disease* that almost all the mortality and sickness of the Tamil laborer is either directly or indirectly due. That disease is ancylostomiasis."* During 1908 he examined 2,000 sick Tamils in estate hospitals and reports: "There was no single one of these coolies who was not affected by ancylostomiasis." At several estates he found "that 60 per cent of the coolies *at work* were in an advanced state of hookworm disease, and that in all cases examined anemia from the same cause was in some degree present." These facts were presented to the Government as indicating the severity of the disease throughout Negri Sembilan. "There is no reason to suppose," continues the report, "that it is any less prevalent in the other states of the Federation."

Dr. A. T. Stanton, bacteriologist, Institute for Medical Research, reports the following findings:†

a. Estate Hospital in Negri Sembilan.—Examined, 152; percentage infected, 56.

b. Rubber estate in Selangor, No. 1.—The place enjoys the reputation of being a "very healthy estate." Number examined, 158; all at work; percentage infected, 25.

c. Rubber estate in Selangor, No. 2.—Considered unhealthy chiefly on account of malaria. Number examined, 64; percentage infected, 53.7.

d. Rubber estate in Selangor, No. 3.—Recently opened up. Number examined, 114; all at work on day of examination; percentage infected, 31.

Dr. E. Naggiar Graham, medical officer, Lower Perack, reports these findings:‡

* "The Prevalence of Ankylostomiasis in Ceylon," XV, 1910, p. 20.

† Ibid., pp. 21 and 22.

‡ J. Trop. M., Lond., 1909, v. 12 (22), p. 333.

TELUK ANSON HOSPITAL.

	Number examined.	Percentage infected.
May, 1910.....	74	54
June, 1910.....	62	61
July, 1910.....	98	47
August, 1910.....	82	57
Estate: S. W.	250	68.8
N. S.	26	73

Dr. Graham estimates that more than 50 per cent of the entire population is infected; that the disease is of great economic importance to the rubber industry.

3. **Conditions favoring spread of the disease.**—In addition to favorable climatic conditions, Dr. Graham reports that drains are very numerous on the rubber estates; that the laborers defecate in these drains; that they use these drains for bathing purposes and frequently drink from them.

4. **Relief measures.**—The Government has sent a letter to managers of estates directing attention to the steps to be taken to prevent the spread of infection. Cases are treated in estate hospitals. Measures so far adopted seem altogether inadequate.

PHILIPPINE ISLANDS.

1. **Distribution of infection.**—Systematic survey of the Islands has not been made; infection has been demonstrated at Manila, Taytay, Las Piñas, Cagayan Valley and other points in Luzon; on the islands of Samar and Cebu. Investigations thus far made indicate that infection is general over the Islands. Dr. C. L. Cole reports* that hookworm

* Mil. Surg., Carlisle, Pa., 1907, v. 21, p. 298.

disease is one of the moost prevalent diseases found in the Islands; that examinations indicate a very widespread infection; that infection among the enlisted men in the army causes great loss of time.

2. Degree of infection.—Systematic investigation has been made at many different points with the following findings:

a. Manila, Bilibid Prison; Garrison, 1908. Examined, 4,106 adults; infected, 52 per cent.

b. Manila; Garrison and Llamas, 1909. Examined, 227 women; infected, 15 per cent. Examined, 158 children under 15 years; infected, 11 per cent.

c. Taytay, Luzon; Garrison, Leynes, and Llamas, 1910. Examined, 1,000; infected, 11.6 per cent.

d. Las Piñas, Luzon; Bureau of Health, 1909. Examined, 6,000; infected: males, 24.2 per cent; females, 8.06 per cent; average, 16.13 per cent.

e. Baguio (elevation 4,770 ft.); Bowman, 1910. Examined, 100 school children; infected, 32 per cent. By Board for the study of Tropical Disease, U. S. Army, 1910. Examined, adult Igarots; infected, 29 per cent.

f. Cagayan Valley, Luzon; Willets, 1911. Examined, 4,278; infected, 54.37 per cent. Adults examined, 1,350; infected, 74.89 per cent.

g. Gaudara Valley, Island of Samar; Nichols and Garrison, 1909. Examined, about 1,000; systematic records not kept, infection frequent.

h. Danao, Island of Cebu; Brewer, 1910. Examined, 51 children; infected, 18 to 35 per cent. Many cases heavy.

i. Government Hospital for the Insane, District of Columbia; Stiles and Garrison, 1906. Examined, 115 soldiers returned from Philippines; infected, 12.17 per cent.

NOTE 1.—With the exception of the examinations made by Stiles and Garrison, 1906, and possibly of examination by Willets, the above statistics are based upon the examination of only one slide. The use of three slides would materially increase these percentages.

2. Dr. Victor G. Heiser reports* that records of more than 1,000 stools of persons at large show about the same conditions among the general population.

3. **Conditions favoring spread of the infection.**—In provinces no sanitary precautions are taken; privies and vaults are unknown; the ground around each house has been contaminated ever since the house was built. Abundant vegetation around the houses furnishes most favorable conditions of shade and moisture. The barefooted householder and his family are constantly exposed to infection.†

4. **Hookworm disease and the death rate.**—Population of the Philippines at time of American occupation is estimated at about 6,500,000; estimated death rate at over 50 per 1,000. At Bilibid Prison, the death rate under lay management was 238 per 1,000. The prison was placed under the management of the Bureau of Health. The usual sanitary measures reduced the death rate to 70 per 1,000; here it stopped and resisted further efforts. All prisoners over 3,500 were examined for intestinal parasites; infected, 84 per cent; infected with hookworm disease, 52 per cent. After treatment, death rate fell to 13 per 1,000, where it has remained up to the time of the report of 1909, or more than a year.‡

* J. Am. M. Ass., Chicago, 1909, v. 52 (2), p. 97.

† Dr. C. L. Cole, Mil. Surg., Carlisle, Pa., 1907, v. 21, p. 298.

‡ Victor G. Heiser, J. Am. M. Ass., Chicago, 1909, v. 52 (2), p. 97.

5. **Relief measures.**—Many systematic investigations have been made to determine the prevalence of infection; cases that come to the regular hospitals are treated; general sanitary conditions are being improved. No adequate systematic measures have been adopted to relieve or eradicate the disease. The Bureau of Health is awaiting further investigations to determine conditions before organizing relief measures on a large scale.

SAMOA.

1. **Discovery.**—On November 2, 1909, Passed Assistant Surgeon P. S. Rossiter, U. S. N., discovered hookworm eggs in the stool of a Samoan; two days later he expelled thousands of hookworms which were identified as *Necator americanus*. The discovery was reported to the Governor on December 2, 1909.

2. **Prevalence of the disease.**—There are on the islands of Tutuila and Manua 42 coastal and 11 inland villages with a total population of 6,667. On the basis of investigations conducted by the special board appointed by the Governor and later investigations by Dr. Rossiter it is estimated that of this population about 70 per cent are infected. For the islands of Upalo and Savaii, German Samoa, the investigation indicates a heavier infection than for the islands of Tutuila and Manua.

3. **Conditions in Samoa favoring spread of the infection.**—"The soil is everywhere loose and sandy; the rain is heavy and the ground is always moist; the temperature ranges between 70 and 90 degrees F. throughout the year. The natives are extremely careless of the disposal of feces,

and in general defecate just beside, if not in, the roads or just outside the houses. A negligible percentage wear shoes, and the native costume, the lava lava, a single strip of cloth about 30 inches wide and 2 yards long, fastened about the waist, permits every part of the body to come in contact with the contaminated soil, for they sit, eat, and sleep on the ground or on mats."

4. **What is being done for its eradication or relief.**—On December 2, 1909, Dr. Rossiter reported to the Governor of Samoa the presence of hookworm infection on the island and recommended measures for its eradication. The Governor appointed a special board to make an investigation and report upon the subject. This board reported making the following recommendations:

(1) The establishment of a board of health whose orders would have the effect of law.

(2) The enactment of a law fixing adequate penalties for disregard of orders or regulations of the board of health.

(3) That orders be issued requiring the people of the colony to immediately erect and use the best latrines their ability and resources can produce; that these latrines be at once put under proper inspection; and that, as necessity demands and means and material permit, these temporary structures be replaced with others of approved design.

(4) That temporarily the hospital steward of the station ship perform the duties of sanitary inspector, and that the Bureau of Medicine and Surgery be requested to allow this station an additional hospital steward to be permanently assigned to this duty.

(5) Estimates were made of the amounts of money required for assisting, where necessary, towns in the construc-

tion of latrines and paying for other work under the board of health.

(6) Recommendations were made of sources from which these funds could be secured.

The Governor approved these recommendations and appointed a board of health to consist of the Captain of the Yard, the Senior Medical Officer and the Secretary of Native Affairs. The sum of \$1,000 appropriated from the customs fund was made available January 1, 1910. The board was ordered to prepare for the consideration of the Governor health regulations following the recommendations of the special board together with suggestions looking toward the enforcement of these regulations. (Information supplied by Surgeon General, U. S. N. (See U. S. Naval Medical Bulletin, vol. 4, p. 476.)

Under recent date (1911) Dr. Rossiter advises that every inhabitant of American Samoa has been supplied with sanitary facilities.

STRAITS SETTLEMENTS.

1. **Distribution of infection.**—Dr. Milton Figart, Vice Consul General at Singapore, reports the infection as covering the entire Settlements. Infection is mostly agricultural; but little mining is done. Both *Necator americanus* and *Ancylostoma duodenale* are present, *Necator* predominating.

2. **Degree of infection.**—Investigations in the Settlements have been less extensive and thorough than in the Federated Malay States; Mr. Figart reports the following results of post-mortems at Tan Took Seng and the general hospital:

a. For 1908, number of post-mortems, 1,837; found infected, 13.3 per cent.

b. For 1909, number of post-mortems, 1,542; found infected, 8.3 per cent.

c. For 1910, number of post-mortems, 1,600; found infected, 10.6 per cent.

The general statement is made that infection in Straits Settlements is much less severe than in the Federated Malay States.

3. **Preventive measures.**—Estate managers are reported as taking some steps toward prevention in the form of better sewage disposal.

SUMATRA.

1. **Distribution of infection.**—Dr. J. Salm, colonial physician at Moeara, Tambesi, reports* that hookworm infection is widespread over the Island of Sumatra; that it is found among the natives of the interior who have never left the region and are still living in the savage state; that conditions clearly show that the infection was not introduced by European occupation.

2. **Degree of infection.**—Dr. Salm made 89 examinations at Moeara Tambesi and found an infection of 42 per cent. Of the natives examined 95.5 per cent were infected.

3. **Relief measures.**—No report on the subject.

* Gaz. hebdomadaire de médecine et de chirurgie, de Bordeaux, 1905, v. 26 (52), p. 615.

IV. AUSTRALIA.

AUSTRALIA.

1. **Distribution of infection.**—Reports from all parts of Australia indicate that infection is confined mainly to Queensland. In Queensland infection has been demonstrated in nearly all the principal centers on or near the eastern coast. These range, according to the report of I. S. C. Elkington, Commissioner of Public Health for Queensland, from Cairns and Port Douglas in the north to the Tweed River, 1,000 miles to the south. The principal centers of infection appear to be Cairns, Geraldton, Ingham, and Nambour. The disease does not appear to extend far back from the coast.

2. **Degree of infection.**—It is not possible to estimate accurately the degree of infection from data now available. Dr. Elkington reports that medical inspection of school children has failed to reveal anything like the results reported from the southern States; that an examination of the mines of Queensland has failed to reveal any clinical symptoms. Dr. T. F. McDonald reports* the disease as flourishing among the people of Johnstone River district (between Townsville and Cairns); that in one school he found 90 per cent of the children infected; that there are 5,000 people in this district that infection is present in every square mile of it, and that it is “sucking the heart’s blood of the whole community.” He reports a prevalent craving for dirt eating and numerous cases of severe moral degeneration

* J. Trop. M., Lond., 1908, v. 11, p. 25.

3. **Source of infection and conditions favoring its spread.**—Dr. McDonald attributes the introduction of the disease into Australia to three sources: the South Sea Islanders, Arabians, Italians. He describes his district as a jungle of scrub 60 miles square; frost unknown; rainfall 200 inches.

4. **Relief measures.**—Ankylostomiasis has been a reportable disease since 1900; leaflets on the subject are distributed among the people; local authorities are advised on application concerning measures for the eradication of the disease.

It is proposed for the coming year to establish at Townsville a local staff under the state department of health to conduct systematic investigation of conditions of the disease in north Queensland; the Institute of Tropical Medicine at Townsville will cooperate.

V. EUROPE.

AUSTRIA.

1. **Infection in Austria.**—From the end of 1903 until March, 1907, hookworm disease prevailed as an epidemic in the coal fields of northwestern Bohemia, known as the Falkman and Brüz districts. Of 108,149 miners in 519 mines 34 cases of hookworm infection were reported. As a result of decisive action by the government the number of cases decreased rapidly from August 1, 1904, until March, 1907, when the disease entirely disappeared. A few cases were reported among persons not engaged in mines, but these were imported. In all there were 76 cases and one death from the time the disease was introduced into Austria until the country was declared free of the infection.

2. **Measures by which the infection was stamped out.**—The Imperial Ministry of Agriculture issued and enforced the following instructions:

- (1) The mine must be kept clean and the floors of the galleries dry.
- (2) Timbers of the mine must be whitewashed with lime.
- (3) Rigid requirement that the workmen use the toilet rooms.
- (4) An adequate supply of closets must be provided.
- (5) Toilet rooms must be so constructed that there will be no leakage from the cesspool.
- (6) Closets must be kept clean and odorless by the use of disinfectants.
- (7) Mud must be removed from the galleries.

(8) Only drinking water known to be good must be used.

(9) Places must be supplied for washing. Eating with unwashed hands is forbidden.

(10) Anemic workmen must be kept under observation by the mine physician and their tools must be examined microscopically at intervals.

(11) When workmen from infected districts are engaged their tools must be microscopically examined.

(12) Workmen afflicted with hookworm disease must be treated by a physician and must not be allowed to return to work until completely recovered.

In 1904 additional regulations were issued by the Ministry of Agriculture, in conjunction with the Minister of the Interior, to prevent the reintroduction of the disease into Austria.

BELGIUM.

1. **Distribution of the infection.**—The infection exists chiefly among mine workers in the coal pits; it is found also among the brickmakers of the industrial parts of western and southern Belgium. The principal infection is in the districts of Liège, Mons, and Charleroi.

2. **Degree of infection.**—In 1904 the degree of infection among the workmen in the Mons district was 6.56 per cent; of the Charleroi district 14 per cent; of the Liège district 23 per cent. In 1910 the infection in the Liège district had been reduced to 5.3 per cent.

3. **What is being done to eradicate the disease.**—Belgium has the situation under control. The good results attained are attributed to the following measures:

(1) Obligation for every miner working underground to produce previous to his engagement and before going into

the pit a certificate of recent date showing that he is not infected with hookworm disease.

(2) Obligation for the employer to cause a second microscopic examination to be made of the workman's stool between the thirtieth and fortieth day after the first examination.

(3) Obligation to have periodical examination of all underground workmen on certain dates.

(4) Obligatory shower baths.

(5) The treatment of all persons found infected till cured.

BULGARIA.

Up to the present time (1911) no infection has been discovered in Bulgaria. The following measures have been approved by Dr. T. Pstrof, Inspector General of Public Health at Sophia, to prevent the importation of the disease into the country:

1. Mine operators are required as far as possible to permit none but native workers to enter the mines.

2. In case of admitting foreign workers, especially those who have worked in the mines of Austro-Hungary, a medical certificate from the country from which they came should be required certifying that the person is free from the disease.

3. Every foreign worker, preferably at the time of his admission, should be placed under observation with a microscopical examination of his fæces for two days. His clothes should be disinfected.

4. Twice a year submit all mine workers to medical examination and make microscopical examination of their stools for ancylostomiasis.

FRANCE.

1. **Distribution of the infection.**—Hookworm infection in France is confined to the mining population, the miners in the vicinity of Lyons and St. Etienne, and in the departments of Nord and Pas de Calais. In the mining region of southern France infection has been demonstrated in the departments of La Loire, Saone-et-Loire, Puy-de-Dome, Allier, Aveyron, and Gard.

2. **Degree of infection.**—The degree of infection varies from mine to mine; many mines are quite free from infection; others in the same region show an infection rate as high as 61.1 per cent, 64.28 per cent, 73.89 per cent (1908). The average for 2,708 miners examined in the mines of Gard, Tarn, Aveyron, Allier, Puy-de-Dome, and Saone-et-Loire was 7.2 per cent. This included many mines that were not infected.

3. **What is being done to eradicate the disease.**—Attention was centered on the matter in 1902 by the serious prevalence of the disease in Westphalia and in the mining district of Liège, Belgium. From the latter place miners were coming into the coal pits of Nord. In 1903 a semi-official investigation and an official investigation in 1904 demonstrated the infection in the mines of Nord and Pas de Calais and pointed to Belgium as the source of infection. Later investigations were made in mining regions of southern France. The Pasteur Institute at Lille, working under the auspices of the central committee of the coal mines of France, has carried on a vigorous attack from the first.

The following practical measures are being carried out:

(1) Every miner before being employed is examined; if infected he is not accepted.

(2) The sanitation of the mines by draining, ventilating, and supplying workmen with movable sanitary pails.

(3) Sanitary surface privies in the neighborhood of the mines.

GERMANY.

1. **Distribution of the infection.**—Infection exists in Rhineland, Westphalia, and the government district of Aachen (Aix-la-Chapelle). A few cases have been found among the brick workers in the vicinity of Cologne. It is confined to miners and brickmakers.

2. **Degree of infection.**—Investigations conducted in 1902 placed the infection in certain Westphalian mines at 19.5 per cent, 20 per cent, 34.14 per cent, 40 per cent, 50 per cent, 79 per cent. Since 1903 the degree of infection has been reduced 95 per cent.

3. **Measures for the relief and eradication of the disease.**—

(1) Institutes have been established for the examination and treatment of workmen.

(2) Every mine worker in infected mines is examined periodically.

(3) Miners found infected are isolated and treated until cured.

These measures have reduced the infection 95 per cent since 1903.

ITALY.

1. **Distribution of the infection.**—Hookworm disease is distributed over the whole of Italy, Sicily, and Sardinia.

It is found chiefly among farm hands, clay workers, and miners.

2. **Degree of infection.**—Statistics for even an approximate estimate of the degree of infection are not available. The Director General of Public Health at Rome reports: "Ancylostomiasis in Italy is frequent in Sicily and in Sardinia; it is rare in other regions." It has been estimated that about 15 per cent of the miners in the district of Palermo take the disease, but the American Consul at Palermo says: "This percentage is rapidly decreasing on account of the energetic measures adopted by both public and private agencies to eradicate the disease."

The infection in Italy seems to be relatively light.

3. **What is being done to eradicate the disease.**—The government has adopted the following measures:

(1) Free distribution to the working classes of a publication written in simple language and intelligible to the most modest intellects, giving practical advice as to the best methods of preventing and combating the disease.

(2) Distribution of circulars to all the prefects of the Kingdom, giving special instructions for the hygiene of workers in the manufacture of bricks and articles from clay. These special instructions are:

- a. Avoid pools of stagnant water.
- b. Meals to be eaten outside of work yards and clay beds to prevent infection of food.
- c. Laborers must wash hands before eating.
- d. Drinking water to be kept in closed receptacles.
- e. Prevent soil pollution by providing closets and enforcing their use.

(3) For the protection of mine laborers all miners are required to be examined periodically and those infected are to be treated.

(4) An active surveillance by the marine sanitary officer of all immigrants landing from Brazil.

THE NETHERLANDS.

1. **Distribution of infection.**—Consul-General Listoe, at Rotterdam, reports that government investigation in 1904 revealed the presence of hookworm infection in the coal mines of Limburg, one of the southern provinces; that the infection has lately been demonstrated among the brickmakers of southern Limburg; that no infection has been found among agricultural workers.

2. **Degree of infection.**—The Government investigation of 1904 showed for the Limburg coal miners an infection of 21.74 per cent. Among the brickmakers the infection is reported at 14.4 per cent.

3. **Relief measures.**—For the coal mines the Government adopted stringent measures, excluding the infected from the mines. As a result of these measures the infection was reduced from 21.74 per cent in 1904 to 2.06 per cent in 1907. Regulations now in force provide for:

- a. The sanitary disposal of all night soil in the mines.
- b. The prevention of any carrier from entering the mines.
- c. The free treatment and disinfection of the brickmakers. The worker is reimbursed for wages lost during treatment.

SPAIN.

1. **Distribution of the infection.**—The Director of Interior Sanitation of Spain, at Madrid, reports: "The country is infected. This malady affects, almost exclusively, the mining districts and is limited to the south of Spain." Robert Frazer, Jr., American Consul at Valencia, reports surface inspection in the township of Tabernes de Valldigna. He says: "The area of the infection is about 10 miles square. It is a warm, frostless belt, subjected too intensive cultivation and irrigation, and is noted for the production of strawberries and other early fruits as well as oranges, rice, peanuts, and table grapes. Dr. Rafael Pastor has treated five cases of hookworm during the past two years, all originating from the same small area referred to. Some of the patients were sent to him by local doctors, who had been treating them for acute anemia."

2. **Degree of infection.**—The Director of Interior Sanitation reports: "In general the intensity is not great at the present moment, except in the mining region of Linares, where there are mines in which the number infected reaches 80 per cent of the total number of workers."

3. **Relief measures.**—On this point the report continues: "The public institutions have done nothing, nor have private agencies done anything so far as is known. Only Dr. Codina, of Castellani, has called the attention of the public authorities to the importation and gravity of this malady in Spain."

SWITZERLAND.

1. **St. Gothard tunnel epidemic.**—The well-known outbreak of hookworm disease among the workmen in the St.

Gothard tunnel (1879-1880) attracted public attention and caused the Swiss Government to institute an investigation. This investigation, conducted by Dr. Sonderregger, resulted in a system of sanitary regulations which freed Switzerland from the infection and has kept it free up to the present time (1911).

2. **Sanitary measures.**—These measures, which were rigidly enforced, provided:

(1) That all new tunnel workmen be carefully examined, and that if infected they be isolated, treated, and not permitted to go to work until all traces of infection had disappeared.

(2) That adequate sanitary closets be provided and that all workmen be required to use them.

(3) That bathing facilities be provided, and that all workmen be required to keep themselves clean.

Dr. Carrière, Acting Director of the Federal Department of Public Health, adds: "It is due to these precautions that during the building of the Simplon and Lötscheberg tunnels no case of ancylostomiasis was discovered."

WALES.

1. **Distribution of infection.**—There is no evidence of infection in Great Britain outside the tin mines of Cornwall.

2. **Control measures.**—A special report on anemia in the Dolcoath mine was made in 1902. The following preventive measures have brought the infection under control:

(1) Use of the sanitary pail under ground.

(2) Treatment of all infected persons.

(3) Education of the miners in preventive measures.

*Forty-six Foreign Countries in Which the Infection is
Widespread.*

I. AFRICA:		Area (sq. mi.)	Population.
1. Algeria	184,474	4,739,556	
2. British East Africa and Zanzibar	640	150,000	
3. Egypt	400,000	9,734,405	
4. Gold Coast Colony.....	40,000	474,000	
5. Lagos and Yuraba.....	28,910	1,500,000	
6. Natal	42,019	983,118	
7. Sierra Leone	4,000	76,655	
8. Tunis	51,000	1,900,000	
II. AMERICAS, THE:			
9. Antigua	108	35,000	
10. Barbados	166	195,588	
11. Brazil	3,218,130	14,333,915	
12. British Guiana	104,000	278,328	
13. British Honduras	7,562	37,479	
14. Colombia	473,202	3,593,600	
15. Dominican Republic	18,755	417,000	
16. Dutch Guiana or Surinam.....	46,060	67,128	
17. Ecuador	116,000	1,205,600	
18. French Guiana	30,500	32,908	
19. Guatemala	48,290	1,747,000	
20. Honduras	46,250	487,500	
21. Jamaica	4,193	743,000	
22. Martinique	381	164,000	
23. Mexico	767,005	13,570,545	
24. Nicaragua	49,200	380,000	
25. Paraguay	157,000	432,000	
26. Panama	31,571	285,000	
27. Peru	463,747	2,660,881	
28. Porto Rico	3,606	953,243	
29. Salvador	7,225	1,006,848	
30. Trinidad	1,754	253,000	
31. Venezuela	593,943	2,323,527	

III. ASIA:

	Area (sq. mi.)	Population.
32. Ceylon	25,333	3,578,333
33. China	4,277,170	426,047,325
34. Cochin China	23,160	2,400,000
35. India	1,766,642	294,361,056
36. Japan	161,198	46,453,249
37. Java	50,554	26,125,000
38. Korea	82,000	10,528,937
39. Malay States	26,500	676,000
40. Philippine Islands	114,326	7,000,000
41. Samoa	181	55,000
42. Straits Settlements	11,543	572,000
43. Sumatra	162,310	3,472,000
44. Turkish Province of Bagdad....	54,503	850,000

IV. AUSTRALIA:

45. Queensland	668,497	503,266
----------------------	---------	---------

V. EUROPE:

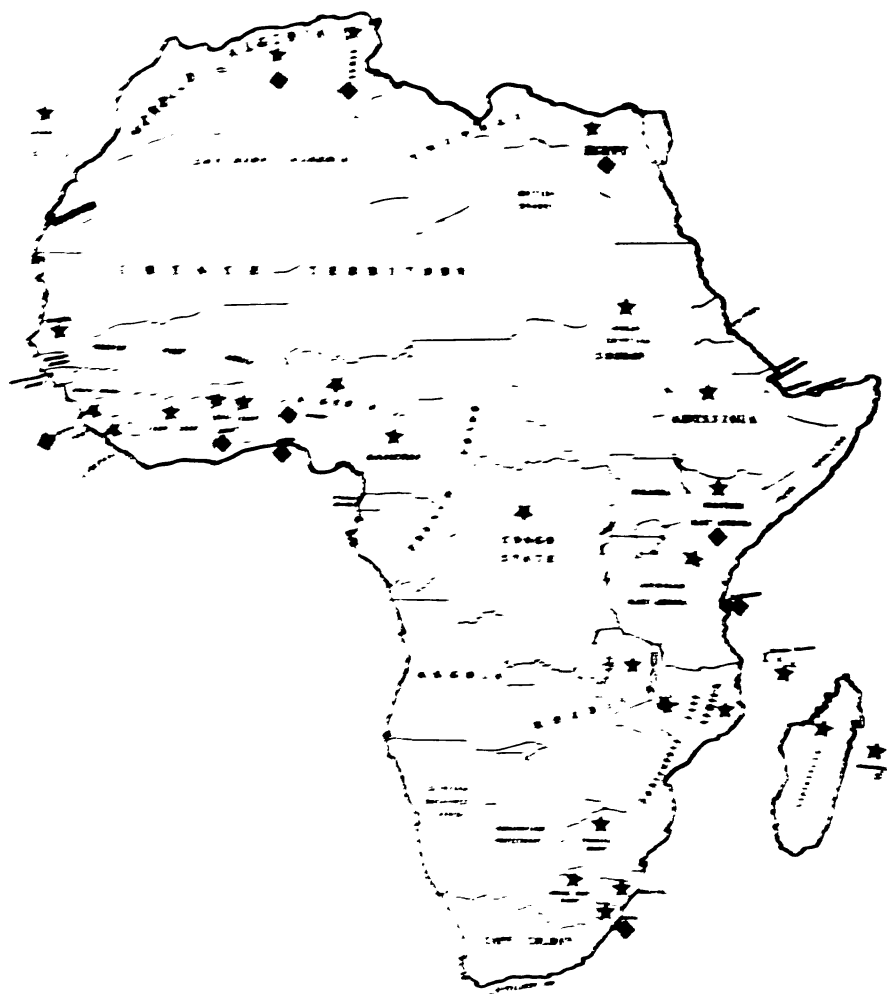
46. Italy	110,550	32,475,253
-----------------	---------	------------

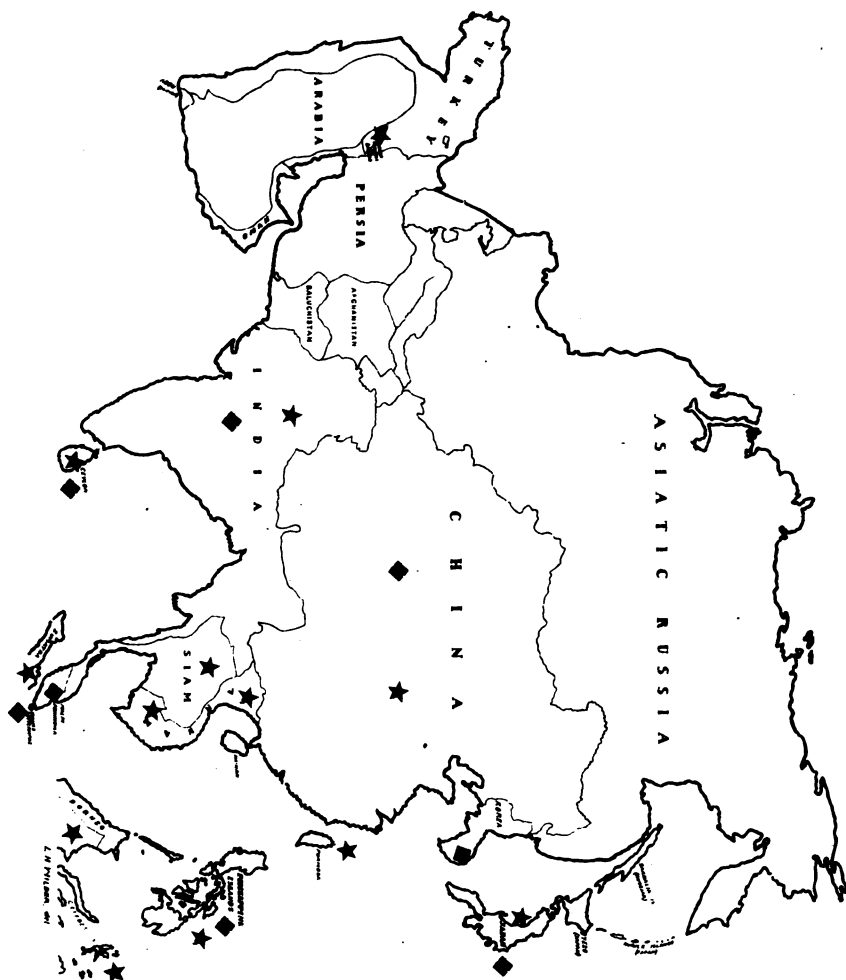
Total.....	14,464,158	919,858,243
------------	------------	-------------

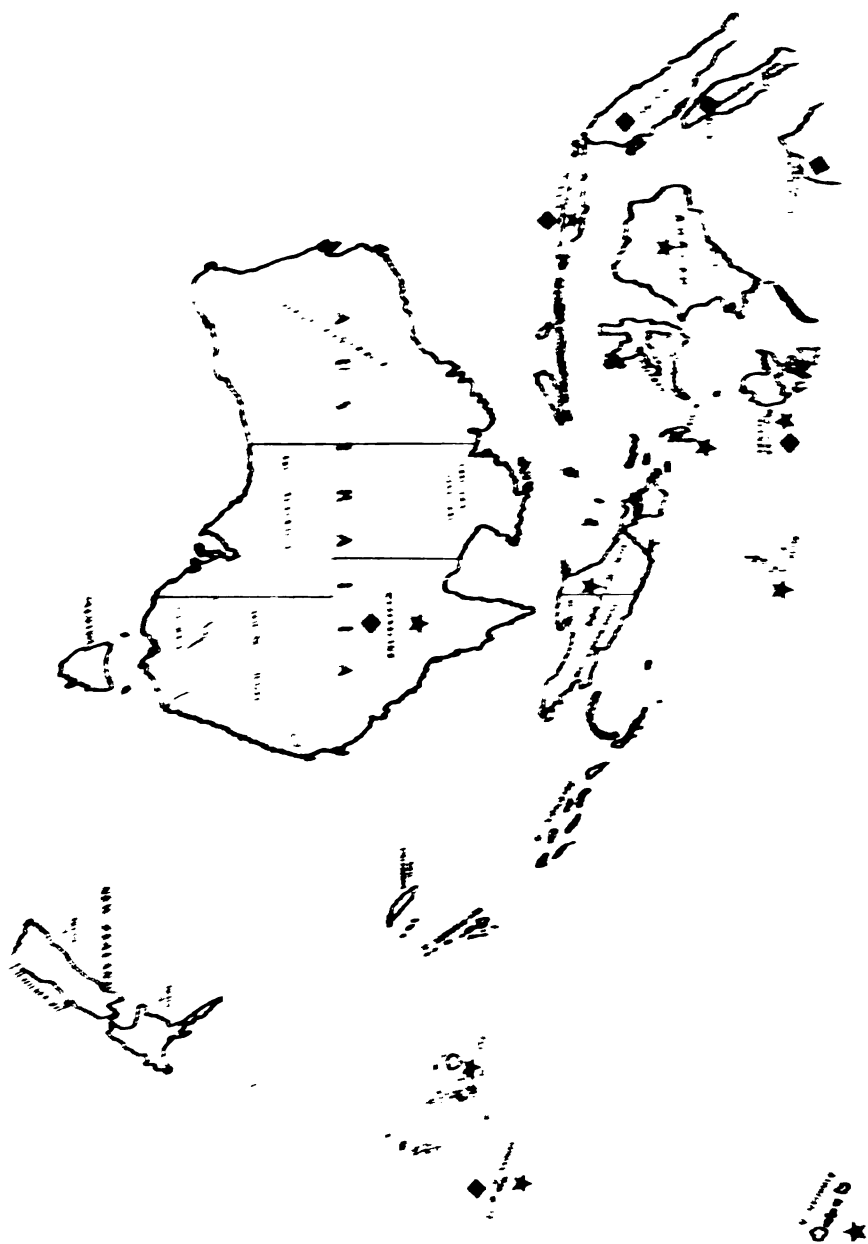
KEY TO MAPS 1 TO 6

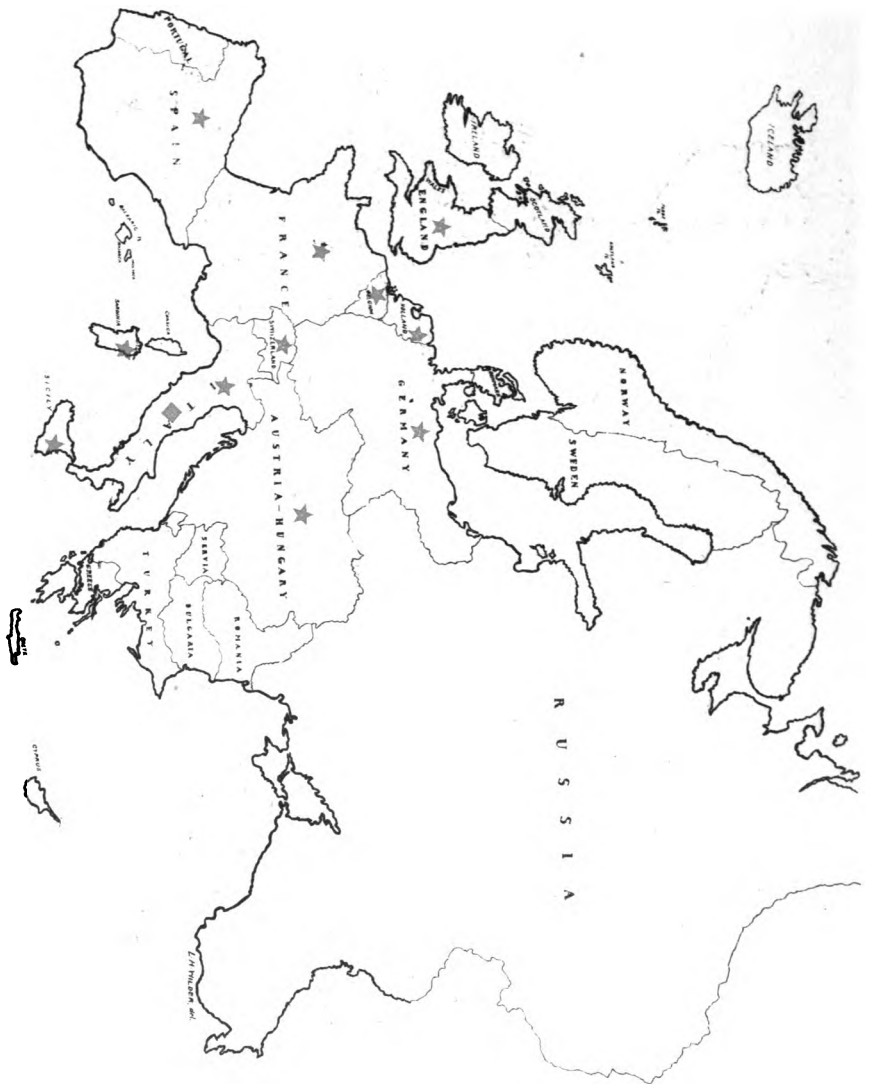
- ★ Presence of infection reported in the published literature on the subject.
- Reports received by the Rockefeller Sanitary Commission show widespread surface infection.

MAP No. 1

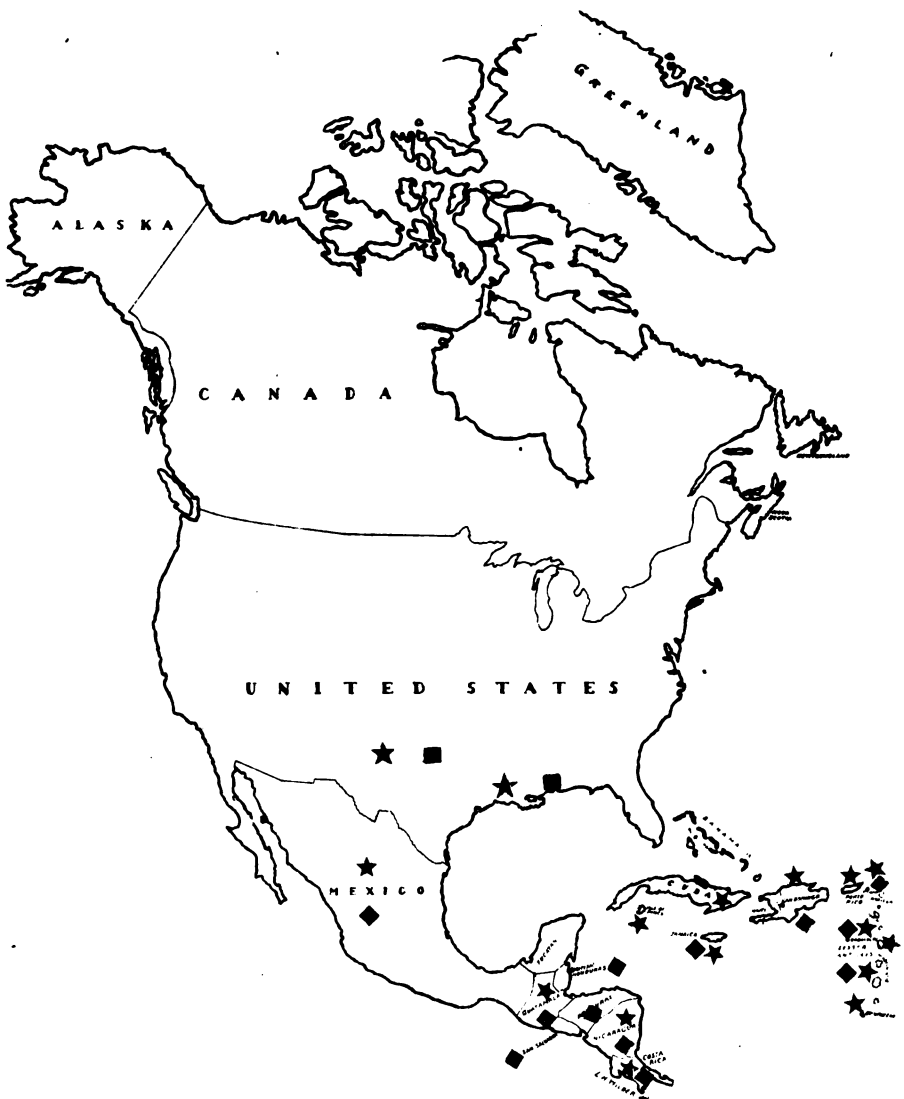








MAP No. 5







(PUBLICATION No. 7)

THE ROCKEFELLER SANITARY COMMISSION
FOR THE
ERADICATION OF HOOKWORM DISEASE

Third Annual Report

OFFICES OF THE COMMISSION
WASHINGTON, D. C., U. S. A.
1912

THE ROCKEFELLER SANITARY COMMISSION

FOR THE

ERADICATION OF HOOKWORM DISEASE

THIRD ANNUAL REPORT

OFFICES OF THE COMMISSION
WASHINGTON, D. C., U. S. A.

1912

THE ROCKEFELLER SANITARY COMMISSION

F. T. GATES

Chairman.

WILLIAM H. WELCH

SIMON FLEXNER

E. A. ALDERMAN

D. F. HOUSTON

P. P. CLAXTON

WICKLIFFE ROSE

Administrative Secretary

725 Southern Building

Washington, D. C.

J. Y. JOYNER

WALTER H. PAGE

H. B. FRISSELL

J. D. ROCKEFELLER, JR.

STARR J. MURPHY

C. W. STILES

Scientific Secretary

24th and E Sts. N. W.

Washington, D. C.

L. G. MYERS

Treasurer

CONTENTS.

CHAPTER I.—General summary with notes by the Administrative Secretary.

CHAPTER II.—Summary of activities and results by States.

CHAPTER III.—Half-tone illustrations.

CHAPTER IV.—Illustrative letters.

CHAPTER V.—Report of the Scientific Secretary.

EXPLANATORY NOTES.

1. The term "number of persons treated" as used in this report signifies the number of persons to whom treatment has been dispensed. Some persons to whom treatment has been dispensed carry the medicine home but do not take it. It is clearly impossible to correct this error in the record. We are confident, however, that the number of persons who have thus failed to take the treatment is more than offset by the very large number of persons who get treated by physicians and otherwise and of whom no report is received and no record is made. The number of persons treated as a direct result of the work is much greater than the number here recorded.

2. The number of persons reported as treated by physicians is based on reports of physicians to the State Directors. In many cases the physicians have not kept an accurate record and report the number of persons treated for the given period as "about" so many. If in any cases this estimate by physicians is an over estimate, the error is offset many times over by the large number of cases treated by physicians who do not report at all.

3. It will be observed that the number of persons microscopically examined in making the infection survey does not equal the total number of microscopic examinations made in a State. All microscopic examinations save those of rural children from 6 to 18 years of age are excluded from the reports of the infection survey.

4. It should be observed that the percentage of infection reported as result of the infection survey is not given as the percentage of infection for the population of the county. The degree of infection among rural children from 6 to 18 years of age is, as a rule, much greater than the average infection for the whole population. The purpose of this note is to guard against attempts to generalize too broadly on the basis of these figures.

5. In interpreting the tables giving numbers of persons treated by quarters for the year 1912, it should be observed that in many of the states the number of persons treated by physicians during the whole year is reported at the end of the fourth quarter.

6. Persons who may desire to see how the work was organized and how the various activities were defined and conducted in the early stages of the work are referred to the First Annual Report by the Administrative Secretary. An account of the dispensary and how its work is conducted may be found in the Second Annual Report. Each state has its own system of records; they are uniform only in the facts recorded. Any person interested may, by writing the State Director in any one of the states, get a complete set of record forms.

PERSONNEL.

Alabama.—State Health Officer: W. H. Sanders. State Director: W. W. Dinsmore. Stenographer: John D. Bibb. Laboratory Force: P. B. Moss, A. Trumper, William Henderson. Field Force: J. Frazer Orr, W. W. Perdue, E. V. Caldwell, C. A. Grote.

Arkansas. Secretary State Board of Health: Morgan Smith. State Director: C. W. Garrison. Stenographer: Lillie Hill. Field Force: T. B. Bradford, T. M. Fly, E. A. Campbell.

Georgia. Secretary and Director of Laboratories: H. F. Harris. State Director: A. G. Fort. Stenographer: Edna Whaley,* C. P. Read,* Elanor Srauss,* Mrs. Hampton. Laboratory Force: C. E. Pattillo, C. H. Dobbs.* Field Force: T. F. Abercrombie, A. W. Wood, C. R. Henry, C. H. Dobbs, S. H. Jacobs.*

Kentucky. Secretary State Board of Health: J. N. McCormack. State Director: A. T. McCormack. Stenographer: Miss C. W. Howell. Laboratory Force: Dr. L. H. South,** Laurine Sigmier, Virginia James, Margaret Forsting, Julia Fenwick, Patricia Fenwick, Alice Hayden, Annie May Frost, Mary Frances Shea, Mrs. Julia Cope, Mrs. M. W. Steele, Mr. Buford Robinson. Field Force: W. W. Richmond, I. A. Shirley, J. S. Lock, M. W. Steele.

Louisiana. President State Board of Health: Oscar Dowling. State Director: S. D. Porter. Stenographer: Miss E. C. Regan. Laboratory Force: W. H. Seeman, J. M. Bodenheimer. Field Force: G. B. Adams, J. D. Baucum, G. C. McKinney, T. E. Wright.

Mississippi. Secretary State Board of Health: W. W. Smithson. State Director: W. S. Leathers. Stenographer: Fannie May Hargis. Laboratory Force: George Hampton, F. A. Williams, S. R. Humphries, Mrs. Henry Boswell. Field Force: R. N. Whitfield, H. H. Howard, D. D. Gill, (substitute for Dr. Boswell), Henry Boswell, C. C. Buchanan, R. D. Dedwylder.

North Carolina. Secretary State Board of Health: W. S. Rankin. State Director: J. A. Ferrell. Stenographer: Inez Reynolds. Laboratory Force: W. C. Riddick, Kolbe Curtice, W. C. Jenkins, E. B. Davis, W. S. Tuttle, H. R. Ray, Charles Stephenson, Mrs. C. L. Pridgen. Field Force: C. F. Strosnider, C. L. Pridgen, P. W. Covington, T. E. Hughes, G. F. Leonard, W. P. Jacocks.

South Carolina. Secretary and State Health Officer: J. A. Hayne. State Director: J. LaBruce Ward. Stenographer: Miss S. D. Pickney. Laboratory Force: J. R. Cain, A. S. Williams. Field Force: F. M. Routh, J. T. Howell, F. D. Rogers, J. A. Riser.

Tennessee. Secretary State Board of Health: R. Q. Lillard. State Director: Olin West. Laboratory Force: Herman Spitz. Field Force: W. J. Breeding, T. B. Yancey, Jr., J. B. Lansden, J. M. Lee, J. E. Lacey,* W. P. Robinson.

Texas. President State Board of Health: Ralph Steiner. State Director: M. H. Boerner. Stenographer: Grace E. Brown. Laboratory Force: W. E. Huddleston, E. K. Cochran, Merit Reagan. Field Force: Hubert Ferrell, O. H. Judkins, C. H. Brownlee.

Virginia. State Commissioner of Health: E. G. Williams. State Director: A. W. Freeman. Stenographer: Inez V. Goddin. Laboratory Force: J. O. Fitzgerald, C. B. Brown*, F. W. Poindexter,* E. G. Gata,* Miss Mildred Martin*, W. R. Hursey,* A. J. Chenery. Field Force: A. C. Fisher, W. A. Brumfield, W. A. Plecker,* H. G. Tarter,* K. E. Miller.

*Resigned.

**State Bacteriologist.

CHAPTER I.

GENERAL SUMMARY WITH NOTES BY THE ADMINISTRATIVE SECRETARY.

1. The total number on record of persons treated for hookworm disease in eleven States for the year 1912 is 238,755. This means the treatment of more than 762 persons a day for every working day in the year.

State.	Persons Treated.
Alabama	11,148
Arkansas	3,029
Georgia	17,211
Kentucky	23,028
Louisiana	22,885
Mississippi	44,178
North Carolina	57,991
South Carolina	36,110
Tennessee	5,103
Texas	7,472
Virginia	10,600
Total.....	238,755

2. For this service the Commission has expended this year \$184,671.60. This means that for every \$0.77 expended by the Commission a human being has been benefited in health and helped to a better scale of living.

3. In getting persons treated, the work shows increase from quarter to quarter throughout the year. The total number of persons treated by quarters is:

For quarter ended March 31, 1912...	22,724
For quarter ended June 30, 1912.....	42,956
For quarter ended September 30, 1912.	64,183
For quarter ended December 31, 1912.	108,892
Total.....	238,755

4. The total number of persons treated for hookworm disease in eleven States for the three years is 393,556. This means the treatment of more than 359 persons a day for every day since the work began.

State.	No. Persons Treated.
Alabama	34,507
Arkansas	8,146
Georgia	26,811
Kentucky	23,028
Louisiana	32,314
Mississippi	80,101
North Carolina	111,872
South Carolina	41,795
Tennessee	8,042
Texas	7,472
Virginia	19,468
Total.....	393,556

5. In getting persons treated the work of the present year shows increase over the records of the two preceding years:

Total number persons treated in 1910..	14,423
Total number persons treated in 1911..	140,378
Total number persons treated in 1912..	238,755

Total for three years..... 393,556

6. **Expenditure per person treated for the three-year period.**—For each person treated the Commission expended:

For the year 1910.....	\$4.66
For the year 1911.....	1.05
For the year 1912.....	.77
Average for three-year period.....	1.02

7. Microscopic examinations.—Positive diagnosis of hook-worm disease is mainly by microscopic demonstration of the eggs of the parasite in the stool of the infected person. The total number of such examinations made by the laboratory and field force in eleven States up to December 31, 1912, is 432,464:

State.	No. Microscopic Examinations.
Alabama	7,612
Arkansas	8,798
Georgia	30,400
Kentucky	45,889
Louisiana	14,931
Mississippi	55,732
North Carolina	181,144
South Carolina	17,009
Tennessee	24,459
Texas	10,758
Virginia	35,732
Total.....	432,464

8. Increase of microscopic work.—In no feature of the work has growth been more rapid or more significant than in the number of microscopic examinations made:

(a) The year 1912 shows a steady increase in number of microscopic examinations throughout the year:

Microscopic examinations for first six months... 110,682

Microscopic examinations for second six months. 216,269

Total.....326,951

(b) The year 1912 shows a marked increase over the records of the two previous years:

Total number microscopic examinations 1910....	14,789
Total number microscopic examinations 1911....	90,724
Total number microscopic examinations 1912....	326,951
Total for three years.....	<hr/> 432,464

9. Cause of increase in microscopic work.—This increase in microscopic work is due to three marked tendencies in the service:

(a) The tendency on the part of State and field directors to require microscopic examination as a basis for treatment. In the beginning treatment was given largely on the basis of clinical diagnosis. Experience has shown that in numerous cases the microscope reveals infection where by clinical diagnosis it would not be suspected; and that, on the other hand, there are anemias with accompanying symptoms where hook-worm infection is not present. When the microscope shows the eggs there can be no doubt.

It has been demonstrated that in some cases even of heavy infection the microscope fails to reveal the eggs. As to procedure in such cases there is a difference of opinion and practice. The tendency is to make microscopic diagnosis the basis of treatment; in cases of extreme clinical symptoms when the eggs cannot be found, to follow one's best judgment based on all the evidence present.

(b) Another factor contributing to the large increase in number of microscopic examinations is the improvement of methods and increase of efficiency in making these examinations. At the beginning of the work the examination of 25 to 35 specimens was regarded as a full day's work. During the present year many of the microscopists without the centrifuge have examined an hundred or more specimens a day;

one microscopist examining centrifuged specimens made a record of 282 examinations in one day.

(c) The third and most significant factor contributing to this increase in microscopic work is the growing tendency on the part of all classes of people to seek examination regardless of symptoms. In the beginning of the work it was difficult to get people to submit specimens. They were squeamish about it; or only those who were ill, it was thought, needed to be examined. It is coming to be more and more generally recognized that all persons living in or near infected territory are subject to infection; that the infected person, whether he is ill or not, is a danger to himself, to his family, and to the community; that, therefore, every person living in or near infected territory, regardless of symptoms, should be examined. At the last dispensary that I visited I saw all classes of people coming or sending for containers; collections of specimens were sent in for whole families, and even for whole schools. During the five weeks of the dispensary in that county 29.2 per cent of the entire population were examined.

10. Preliminary infection survey.—Infection has been demonstrated in 83 counties of Texas; of the 884 counties in the other ten States, infection has been found in 796. No special effort is being made to push the preliminary survey further; it is taken for granted that as the remaining 88 counties are reached in the regular course of the work, infection in some degree will be found in all of them.

11. Definite survey to determine degree of infection.—This survey is based on a microscopic examination of at least 200 children between the ages of 6 and 18, taken at random—that is, without reference to clinical symptoms—from rural

districts distributed over the county. This survey has been completed for 230 counties in eleven States. The total number of children examined for the survey in the 230 counties is 158,555, or an average of 689 per county.

In number of counties surveyed and in number of children examined per county, the work of the present year shows a marked advance over that of last year:

(a) Number of counties surveyed, 1911.....	87
Number of counties surveyed, 1912.....	143
	<hr/>
Total.....	230
(b) Average number children examined per county, 1911	428
Average number children examined per county, 1912	818
	<hr/>
Total	1,246

12. Degree of infection among country school children.—

The degree of infection varies from county to county and from community to community within a county. The records show a percentage of infection by counties ranging from 2.5 to 94. Of the 158,555 rural children microscopically examined in 230 counties in 11 States, 78,572, or 50.9 per cent., were found infected.

13. **Sanitary survey.**—This survey is an inspection of privy conditions at country homes to determine their degree of efficiency in preventing soil pollution. Its methods are described in our second annual report. The survey has been completed in 308 counties. In number of counties surveyed and in number of homes inspected the present year shows increase over the record of last year:

(a) Number of counties surveyed, 1911.....	125
Number of counties surveyed, 1912.....	183
Total.....	308
(b) Number of homes inspected, 1911.....	43,448
Number of homes inspected, 1912.....	59,898
Total.....	103,346

14. **Degree of soil pollution at farm homes.**—For the 308 counties surveyed, the records show a sanitary index* for counties ranging from 0 to 19.2 on a scale of a possible 100. A total of 103,346 farm homes taken at random in 308 counties scattered over eleven states have been inspected; of these 50,637 have no privy. For the 103,346 homes the sanitary index, estimated as for a county, is 5.7%.

No. privies type A at.. 100%	151	15,100
No. privies type B at.. 75%	225	16,875
No. privies type C at.. 50%	106	5,300
No. privies type D at.. 25%	2,071	51,775
No. privies type E at.. 10%	50,156	501,560
No. privies type F at.. 0%	50,637	0

Total number homes examined.	103,346	590,610
Sanitary index		5.7%

15. **The county dispensary.**—†The county dispensary has become the key to the work; with experience its organization has become more definite and its methods of work more effective. Increase of efficiency is exhibited in every item of the dispensary record:

*See Second Annual Report, p. 25.

†For detailed account of the county dispensary and its method of operation see Second Annual Report, pp. 18-22.

(a) Number of counties making appropriations for dispensaries, 1911.....	76
Number of counties making appropriations for dispensaries, 1912.....	157
Total for two years.....	233
(b) Total amount appropriated by counties, operating 1911	\$10,799.60
Total amount appropriated by counties, operating 1912	25,743.46
Total for two years.....	\$36,543.06
(c) Number counties in which dispensaries were conducted, 1911.....	66
Number counties in which dispensaries were conducted, 1912.....	171
Total for two years.....	237
(d) Number microscopic examinations made at dispensaries, 1911	54,367
Number microscopic examinations made at dispensaries, 1912	272,898
Total for two years.....	327,265
(e) Number dispensary weeks, 1911.....	349
Number dispensary weeks, 1912.....	963½
Total for two years.....	1,312½
(f) Number persons treated at dispensaries, 1911	74,005
Number persons treated at dispensaries, 1912	149,899
Total for two years.....	223,904

16. Dispensary exhibit.—The county dispensary is an educational agency. While examining and treating the people it is teaching them by demonstration. Its teaching power has been greatly increased this year by the improvement of the dispensary exhibit. This exhibit includes a series of charts; a series of photographs; a few striking posters; specimens of grown hookworms; specimens of other intestinal parasites; a bit of intestine with hookworms attached to the lining; hookworm eggs under the microscope; live hookworm embryo under the microscope; cases that have been treated. Some local person, preferably a local physician, is enlisted to take charge of the exhibit and keep it working continuously throughout the day.

17. Co-operation of physicians.—The physicians have given more effective co-operation this year than ever before. In addition to their work in treating patients for hookworm disease they have aided in securing county appropriations for the dispensaries; they have prepared for the coming of the dispensary, in many cases supplying the room and equipment for its work. When the dispensaries have opened in their communities they have urged their people to attend; they have collected specimens, brought them into the dispensary for examination, and supervised the treatment of their people; they have aided at the microscope; have given lectures at the dispensaries and at schools; have taken charge of the dispensary exhibit and kept it working throughout the day. In the last three counties visited in two states I found every physician actively co-operating in the work of the dispensary. At one dispensary point I met ten local physicians who were active all day getting their people in and getting them examined; one of these physicians brought in 40 specimens at

one time. In one state, physicians in six counties are reported as giving to the dispensary work 492 days of their time and labor without compensation. In some of the States a very large percentage of the physicians are reporting their experience with the disease, although such report must be purely voluntary and a labor of love. In many cases they have written full accounts of interesting cases and have given hearty endorsement of the work in letters for publication. The physicians who are thus active in the work are in it to stay:

(a) Physicians reported treating the disease, 1911...	4,126
Physicians reported treating the disease, 1912...	6,857
(b) Number persons physicians report treating, 1911.	53,167
Number persons physicians report treating, 1912.	75,870
Total.....	129,037

18. Co-operation of other agencies.—In no respect has the work shown more encouraging growth this year than in the co-operation of many agencies whose work cannot be tabulated. The press, the ministers, the county boards of health and county health officers, county boards of supervisors, state departments of education, county school superintendents and public school teachers—all these have given indispensable aid in the conduct of the work. Without this aid the results exhibited in this report could not have been accomplished. Many of these agencies have been helpful from the beginning, but during the year just ended their co-operation has been more active, more definite, and therefore much more effective. Something of the spirit and value of the service which they have rendered is exhibited in the “Notes on the work of the year” in the reports by states.

19. **Co-operation of the people.**—After all has been said the co-operation that has counted for most is the co-operation of the common man. The real purpose of the dispensary is to carry the gospel of sanitation into the homes of the people and make it a living force in their daily lives. The most effective teacher in any community is the neighbor who has been treated. He takes his own specimen to the dispensary; through the microscope he sees the eggs in his own stool; as a part of the dispensary exhibit he sees the squirming embryo of the parasite that has destroyed his own vitality; he takes the treatment; he feels the pulse of a new life; he brings his family and his neighbors to the next dispensary; he brings specimens from those who are bed-ridden; he carries the news of cures; he sends infected persons to their family physicians; he influences public officials; he creates a community sentiment which expresses itself in better laws and larger appropriations and becomes the basis of permanent sanitary reform.

20. **Improvement in sanitation.**—To put a stop to soil pollution is at once the most difficult and the most important result to be accomplished in this work. The building of sanitary privies has not kept pace with getting the people treated; such rapid change in ingrained habit has not been expected. But that gratifying progress in sanitation is being made is exhibited in the "Notes on work of the year" in the reports by states. Worthy of special note are the co-operation of state and county school officials with the public health agencies in having sanitary privies built at the schools; the systematic and aggressive activity of the Virginia, Louisiana and Mississippi State Departments of Health in the interest of general sanitation. The results of definite instruction in

sanitation are strikingly exhibited in the following facts recently given me by W. L. Moss, Vice-President and General Manager of the Continental Coal Corporation, Pineville, Kentucky:

Conditions in the camps.—In June, 1911, there were in the company's camps about 150 cases of typhoid; cases of bowel complaint were numerous; hookworm infection ran about 65 per cent; soil pollution was practically universal; the wells and springs were contaminated; flies had free range.

What was done.—Dr. McCormack, Dr. Lock and Dr. Hendren, the camp physician, urged reform. Mr. Moss secured from his board of directors an appropriation of \$25,000 for sanitary improvement; all open wells and springs were filled up; deep wells from 80 to 90 feet deep were bored, protected, supplied with pumps; 400 new sanitary closets were built and hundreds of old closets were made over.

Results.—During the summer of 1912 and up to the time of my visit (October, 1912) there had not been a case of typhoid in the camps; cases of diarrhoea were reduced to about half; the cases of hookworm disease have been treated. From June, 1910, to June, 1911, the force of about 1800 men on the company's pay-roll put on the cars about 600,000 tons of coal; from June, 1911, to June, 1912, the same force put on the cars a fraction over 800,000 tons of coal. Mr. Moss stated with emphasis that merely as an economic proposition this \$25,000 is the best investment the company has made.

TABLE 1.—*Infection Survey, 1912.*

State.	No. counties surveyed.	No. children examined,	Number infected.	Per ct. infected.
Alabama	12	3,549	2,030	57.2
Arkansas	9	4,139	2,155	52.
Georgia	14	6,375	5,098	79.9
Kentucky	10	23,501	7,021	32.4
Louisiana	10	8,236	4,027	48.8
Mississippi	26	20,640	15,368	74.4
North Carolina	33	38,381	18,745	48.8
South Carolina	6	2,796	1,310	46.8
Tennessee	10	3,146	1,286	40.8
Texas	4	4,225	2,792	66.1
Virginia	9	6,300	2,814	44.7
Totals	143	121,288	62,646	

TABLE 2.—*Sanitary Survey, 1912.*

State.	Number of counties surveyed.	Number of rural homes inspected.
Alabama	17	3,717
Arkansas	10	4,735
Georgia	10	3,801
Kentucky	9	3,986
Louisiana	10	8,000
Mississippi	28	11,124
North Carolina	20	6,555
South Carolina	18	4,639
Tennessee	9	2,104
Texas	4	1,222
Virginia	48	10,015
Totals	183	59,898

TABLE 3.—*Dispensary Summary, 1912.*

State.	No. of persons and times treated.						Total No. persons treated.	Total No. treatm'ts.
	one	two	three	four	five	six		
Alabama	5,723	1,817	546	76	6	.....	5,723	8,168
Arkansas	2,208	809	473	15	.....	.....	2,208	3,595
Georgia	9,456	1,664	262	33	7	211	9,456	11,633
Kentucky	6,353	82	.....	.....	.....	.....	6,353	6,435
Louisiana	11,020	6,013	2,010	134	9	.....	11,020	19,186
Mississippi	33,977	28,391	23,099	951	132	51	33,977	86,727
North Carolina	42,132	29,633	21,581	2,261	465	73	42,132	96,173
South Carolina	25,270	8,777	6,124	2,153	111	6	25,270	42,441
Tennessee	3,842	1,972	651	50	13	2	3,842	6,530
Texas	4,262	1,053	163	1	.....	.....	4,262	5,479
Virginia	5,656	5,306	4,172	22	.....	.....	5,656	15,156
Totals	149,899	85,517	59,081	5,696	743	132	149,899	301,433

TABLE 4.—*Dispensary Summary, 1912—Continued.*

State.	No. of counties operating.	Duration of campaign.	Total appropriated by counties operating.
Alabama	14	72 weeks	\$1,475
Arkansas	4	13 weeks	200
Georgia	17	108 weeks	2,950
Kentucky	6	31 weeks	1,700
Louisiana	12	56 weeks	1,463
Mississippi	28	178 weeks	4,175.56
North Carolina	39	227 weeks	9,579.90
South Carolina	20	145½ weeks	1,025
Tennessee	19	73 weeks	1,375
Texas	4	24 weeks	1,200
Virginia	8	36 weeks	600
Totals	171	963½ weeks	25,743.46

TABLE 5.—*Enlisting the Physicians.*

State.	Number of physicians in state.	Number of physicians personally instructed.	Number of lectures to physicians.	Number of physicians reached.	No. of letters and circu- lars sent to physicians.	Number of bulletins sent to physicians.	Physicians now treating the disease.	Cases reported treated by physicians.
Alabama	2,418	396	18	234	5,369	8,750	406	4,749
Arkansas	3,600	794	68	3,600	8,028	4,500	608	821
Georgia	3,022	477	7	603	5,739	6,732	974	6,887
Kentucky ...	3,708	2,358	66	1,854	16,405	79,130	1,125	15,750
Louisiana ...	2,033	377	3	100	11,863	660	161	5,342
Mississippi ..	1,783	905	16	643	8,794	16,456	660	10,201
N. Carolina..	1,720	1,145	10	168	8,622	.....	1,307	15,859
S. Carolina..	1,113	411	10	1,200	3,200	500	624	10,840
Tennessee ..	3,449	940	22	984	8,784	1,051	279	584
Texas	5,789	490	3	30	6,422	2,500	519	3,210
Virginia	2,357	365	18	560	6,300	8,900	194	1,627
Totals....	30,992	8,658	241	9,976	89,526	129,179	6,857	75,870

TABLE 6.—*Putting a Stop to Soil Pollution—Educating the People.*

State.	Through the schools.				Through public lectures.	
	Teachers reached.				Number of lectures given.	Estimated number of persons reached by these lectures.
	Number of teachers in state.	By visit.	By letter.	By bulletin or leaflet.		
Alabama	9,220	665	389	1,600	106	12,375
Arkansas	10,175	650	285	10,175	190	49,883
Georgia	8,714	17	423	.....	307	29,022
Kentucky	9,487	1,635	6,750	1,064	480	80,122
Louisiana	6,403	894	1,200	4,000	407	33,999
Mississippi	10,166	731	1,273	10,166	1,034	90,795
North Carolina ..	8,422	197	.....	.....	454	36,849
South Carolina ...	4,255	50	500	1,000	90	5,400
Tennessee	9,233	871	1,357	1,167	118	20,264
Texas	21,277	98	230	230	138	13,308
Virginia	9,000	410	950	9,000	410	46,850
Totals	106,352	6,218	13,357	38,402	3,734	418,867

TABLE 7.—*Putting a Stop to Soil Pollution—Educating the People—Continued.*

State.	Through bulletins.	Through the press.			Articles furnished for publication.
	Number of bulletins and leaflets distributed.	Papers in state.	Number personally visited.	Letters to press.	
Alabama	74,354	235	63	41	136
Arkansas	48,102	290	75	25	212
Georgia	143,258	311	57	.....	55
Kentucky	179,130	289	70	1,650	75
Louisiana	62,265	198	60	572	51
Mississippi	224,997	234	172	1,306	1,055
North Carolina	315,070	255	175	2,300	319
South Carolina	100,100	156	81	50	77
Tennessee	59,797	252	67	66	101
Texas	38,956	933	27	125	139
Virginia	165,000	211	50	25	216
Totals	1,411,029	3,364	897	6,160	2,436

TABLE 8.—*Examinations and Treatments.*

State.	Examinations.			Persons treated.		
	Clin.	Micro.	Total.	By physicians.	By staff.	Total
Alabama	22,926	4,880	27,806	4,749	6,399	11,148
Arkansas	5,000	4,896	9,896	821	2,208	3,029
Georgia .....	.....	21,419	21,419	6,887	10,324	17,211
Kentucky .....	.....	45,055	45,055	15,750	7,278	23,028
Louisiana	36,759	8,877	45,646	5,342	17,543	22,885
Mississippi	11,214	39,293	50,507	10,201	33,977	44,178
North Carolina	1,978	135,867	137,845	15,859	42,132	57,991
South Carolina	42,502	13,872	56,374	10,840	25,270	36,110
Tennessee	17,574	16,038	33,612	584	4,519	5,103
Texas .....	.....	10,758	10,758	3,210	4,262	7,472
Virginia	15,227	25,996	41,223	1,627	8,973	10,600
Totals	153,190	326,951	480,141	75,870	162,885	238,755

TABLE 9.—*Number of persons treated by quarters, 1912.*

State.	March 31.	Quarter ending		Dec. 31.	Total.
		June 30.	Sept. 30.		
Alabama	361	1,359	3,351	6,077	11,148
Arkansas	66	25	1,492	1,446	3,029
Georgia	1,713	3,338	4,816	7,344	17,211
Kentucky .....	....	367	4,658	18,003	23,028
Louisiana	4,541	6,396	5,364	6,584	22,885
Mississippi	2,617	7,395	15,355	18,811	44,178
North Carolina...	9,261	9,473	17,072	22,185	57,991
South Carolina...	3,669	11,122	6,225	15,094	36,110
Tennessee	496	1,957	1,592	1,058	5,103
Texas .....	....	....	1,478	5,994	7,472
Virginia .....	....	1,524	2,780	6,296	10,600
Totals	22,724	42,956	64,183	108,892	238,755

TABLE 10.—*Expenditures, 1912.*

State.	By counties.	By state.	By commis'n.	Total.
Alabama	\$1,475.00	\$2,844.34	\$12,135.78	\$16,455.12
Arkansas	64.22	....	13,243.41	13,307.63
Georgia	2,618.16	643.33	15,726.44	18,987.93
Kentucky	1,700.00	4,000.00	14,823.41	20,523.41
Louisiana	1,463.00	2,500.00	14,260.40	18,223.40
Mississippi	3,875.36	3,000.00	19,611.34	26,486.70
North Carolina....	8,354.91	5,000.00	19,153.84	32,508.75
South Carolina....	600.00	234.75	14,086.83	14,921.58
Tennessee	771.82	....	16,514.06	17,285.88
Texas	1,059.97	960.10	4,117.96	6,138.03
Virginia	500.00	790.00	13,637.16	14,927.16
Totals	\$22,482.44	\$19,972.52	\$157,310.63	\$199,765.59
Expenses of Administrative Secretary's office.....				\$22,191.64
Expenses of Scientific Secretary's office.....				4,349.42
Expenses of Treasurer's office.....				557.89
Special and sundry expenses.....				262.02
Total expended in 1912.....				\$227,126.56

TABLE 11.—*Infection survey by years*

State.	No. counties surveyed.		No. children examined.	
	1911.	1912.	1911.	1912.
Alabama	2	12	840	3,549
Arkansas	9	9	2,685	4,139
Georgia	2	14	568	6,375
Kentucky		10		23,501
Louisiana	10	10	3,638	8,236
Mississippi	17	26	9,561	20,640
North Carolina	21	33	11,466	38,381
South Carolina	3	6	1,188	2,796
Tennessee	13	10	3,271	3,146
Texas		4		4,225
Virginia	10	9	4,050	6,300
Totals	87	143	37,267	121,288

TABLE 12.—*Sanitary survey by years.*

State.	No. counties surveyed.		No. rural homes inspected.	
	1911.	1912.	1911.	1912.
Alabama	7	17	2,502	3,717
Arkansas	11	10	6,159	4,735
Georgia	11	10	4,981	3,801
Kentucky		9		3,986
Louisiana	11	10	6,485	8,000
Mississippi	9	28	2,428	11,124
North Carolina	44	20	13,251	6,555
South Carolina	4	18	2,293	4,039
Tennessee	14	9	2,898	2,104
Texas		4		1,222
Virginia	14	48	2,451	10,015
Totals	125	183	43,448	59,898

TABLE 13.—*Microscopic examinations by years.*

State.	Number of persons examined in			Total.
	1910.	1911.	1912.	
Alabama	92	2,640	4,880	7,612
Arkansas	442	3,460	4,896	8,798
Georgia	1,165	7,816	21,419	30,400
Kentucky		834	45,055	45,889
Louisiana	79	5,975	8,877	14,931
Mississippi	1,682	14,757	39,293	55,732
North Carolina	7,949	37,328	135,867	181,144
South Carolina	85	3,052	13,872	17,009
Tennessee	545	7,876	16,038	24,459
Texas			10,758	10,758
Virginia	2,750	6,986	25,996	35,732
Totals	14,789	90,724	326,951	432,464

TABLE 14.—*Dispensaries by years.*

a. Number of counties in which dispensaries were conducted:

State.	1911.	1912.	Total
Alabama	12	14	26
Arkansas	1	4	5
Georgia	2	17	19
Kentucky		6	6
Louisiana	9	12	21
Mississippi	13	28	41
North Carolina	17	39	56
South Carolina	4	20	24
Tennessee	5	19	24
Texas		4	4
Virginia	3	8	11
Totals	66	171	237

TABLE 15.—*Dispensaries by years—Continued.*

b. Total amount appropriated by counties operating:

State.	1911.	1912.	Total.
Alabama	\$2,035.00	\$1,475.00	\$3,510.00
Arkansas	50.00	200 00	250.00
Georgia	300.00	2,950.00	3,250.00
Kentucky .....	....	1,700.00	1,700.00
Louisiana	1,150.00	1,463.00	2,613.00
Mississippi	2,114.60	4,175.56	6,290.16
North Carolina	4,300.00	9,579.90	13,879.90
South Carolina .....	....	1,025.00	1,025.00
Tennessee	550.00	1,375.00	1,925.00
Texas .....	....	1,200.00	1,200.00
Virginia	300.00	600.00	900.00
Totals	\$10,799.60	\$25,743.46	\$36,543.06

TABLE 16.—*Dispensaries by years—Continued.*

c. Dispensary weeks:

State.	1911.	1912.	Total.
Alabama	83	72	155
Arkansas	3	13	16
Georgia	12	108	120
Kentucky		31	31
Louisiana	24	56	80
Mississippi	64	178	242
North Carolina	91	227	318
South Carolina	38	145½	183½
Tennessee	19	73	92
Texas		24	24
Virginia	15	36	51
Totals	349	963½	1,312½

TABLE 17.—*Dispensaries by years—Continued.*

d. Microscopic Examinations at dispensaries:			
State.	1911.	1912.	Total.
Alabama	2,640	4,241	6,881
Arkansas	1,859	4,296	6,155
Georgia	3,054	18,434	21,488
Kentucky .....	....	22,831	22,831
Louisiana	4,761	8,218	12,979
Mississippi	13,157	37,994	51,151
North Carolina	17,223	126,106	143,329
South Carolina	1,787	11,782	13,569
Tennessee	7,269	15,141	22,410
Texas .....	....	3,428	3,428
Virginia	2,617	20,427	23,044
Totals	54,367	272,898	327,265

TABLE 18.—*Dispensaries by years—Continued.*

e. Number of persons treated at dispensaries:			
State.	1911.	1912.	Total.
Alabama	19,489	5,723	25,212
Arkansas	287	2,208	2,495
Georgia	972	9,456	10,428
Kentucky .....	....	6,353	6,353
Louisiana	5,001	11,020	16,021
Mississippi	15,388	33,977	49,365
North Carolina	29,172	42,132	71,304
South Carolina	2,437	25,270	27,707
Tennessee	665	3,842	4,507
Texas .....	....	4,262	4,262
Virginia	594	5,656	6,250
Totals	74,005	149,899	223,904

TABLE 19.—*Number persons treated by physicians by years.*

State.	1911.	1912.	Total.
Alabama	3,870	4,749	8,619
Arkansas	1,500	821	2,321
Georgia	7,228	6,887	14,115
Kentucky .....	....	15,750	15,750
Louisiana	1,197	5,342	6,539
Mississippi	15,803	10,201	26,004
North Carolina	16,709	15,859	32,568
South Carolina	1,774	10,840	12,614
Tennessee	666	584	1,250
Texas .....	....	3,210	3,210
Virginia	4,420	1,627	6,047
Totals	53,167	75,870	129,037

TABLE 20.—*Number of persons treated by years.*

State.	1910	1911	1912	Total.
Alabama .....	....	23,359	11,148	34,507
Arkansas	3,330	1,787	3,029	8,146
Georgia.....	1,400	8,200	17,211	26,811
Kentucky .....	....	....	23,028	23,028
Louisiana .....	....	9,429	22,885	32,314
Mississippi	824	35,099	44,178	80,101
North Carolina	8,000	45,881	57,991	111,872
South Carolina	665	5,020	36,110	41,795
Tennessee	204	2,735	5,103	8,042
Texas .....	...	....	7,472	7,472
Virginia .....	....	8,868	10,600	19,468
Totals	14,423	140,378	238,755	393,556

TABLE 21.—*Number physicians treating the disease by years.*

State.	1911.	1912.
Alabama	227	406
Arkansas	200	608
Georgia	690	974
Kentucky .....	....	1,125
Louisiana	159	161
Mississippi	786	660
North Carolina.....	1,195	1,307
South Carolina	100	624
Tennessee	256	279
Texas .....	....	519
Virginia	513	194
Totals	4,126	6,857

TABLE 22.—*Expenditures and treatments by years.*

	Expended.	No. persons. treated.	Expenditure per person treated.
1910	\$67,223.44	14,423	\$4.66
1911.....	149,436.16	140,378	1.05
1912	184,671.60	238,755	.77
Totals	\$401,331.20	393,556	1.02

CHAPTER II.

SUMMARY OF ACTIVITIES AND RESULTS BY STATES.

ALABAMA.

I. State survey by counties.

1. Infection survey, based on an examination of at least 200 children between the ages of 6 and 18 years, taken at random from the country:

County.	Area in Sq. miles.	Population.	Number examined.	Number infected.	Perctg. of infection.
Barbour	920	32,728	212	141	66.5
Bibb	622	22,791	314	166	52.8
Bullock	609	30,196	211	80	37.9
Butler	769	29,030	165	85	51.5
Choctaw	912	18,483	625	518	82.8
Covington	1,029	32,124	200	131	65.5
Greene	681	22,717	221	117	52.9
Houston		32,414	200	114	57.0
Madison	806	47,041	220	30	13.6
Marshall	590	28,553	580	292	50.3
Pickens	937	25,055	376	225	59.8
Wilcox	914	33,810	225	131	58.2

2. Sanitary survey, based on an inspection of privy conditions at least 100 country homes:

County.	TYPE OF PRIVY.			Total No. inspected.
	D	E	F	
Barbour	1	46	156	203
Bibb		202	41	243
Bullock		178	115	293
Butler		151	49	200
Choctaw	3	88	136	227
Clarke		194	25	219
Covington		122	78	200
Crenshaw		55	163	218
Elmore		53	141	194
Henry		32	189	221
Houston	4	166	58	228
Madison		138	72	210
Marshall		119	107	226
Monroe		147	53	200
Pickens		106	97	203
Sumter		203	29	232
Wilcox		168	32	200

II. Getting the people treated.

1. Enlisting the physicians:

(1) Number of physicians in state.....	2,418
(2) Number of physicians personally interviewed.....	396
(3) Number of lectures to physicians.....	18
(4) Number of physicians thus reached.....	234
(5) Number of circular letters sent to physicians.....	5,369
(6) Number of bulletins sent to physicians.....	8,750
(7) Number of physicians now treating the disease.....	406
(8) Number of persons treated by physicians.....	4,749

2. Getting the people to seek examination and treatment:

(1) Number of schools inspected.....	147
(2) Number of persons examined:	
Clinically	22,926
Microscopically	4,880
(3) Number of persons treated by field force:	
At dispensaries	5,723
At schools	676
(4) Total number of persons treated on record.....	11,148

3. Work of county dispensaries:

Doctor and county.	Amount of appropriation.	Duration of campaign.
(Dr. Orr.)		
Barbour	\$150.00	4½ weeks
Crenshaw	150.00	6 weeks
Elmore	150.00	4 weeks
Henry	150.00	4 weeks
(Dr. Purdue.)		
Bibb	150.00	4 weeks
Monroe	100.00	5½ weeks
Wilcox	100.00	6 weeks
Clarke	100.00	to be opened Jan. 1st.
(Dr. Caldwell.)		
Bullock	75.00	8 weeks
Madison	100.00	4 weeks
Marshall	100.00	9½ weeks
Sumter	Reported	7 weeks
(Dr. Grote.)		
Choctaw	Reported	5½ weeks
Pickens	150.00	4½ weeks
	<u>\$1,475.00</u>	<u>72½ weeks</u>

Doctor and county.	Number of persons and times treated.					Total No. persons treated.	Total No. treatm'ts.
	1	2	3	4	5		
(Dr. Orr.)							
Barbour	546	99	44	13		546	702
Crenshaw ...	1,324	517	181	20	3	1,324	2,045
Elmore	38	16	4			38	58
Henry	99	30				99	129
(Dr. Purdue.)							
Bibb	203	61	42	10		203	316
Monroe	369	82	35	12		369	498
Wilcox	540	117	30	4		540	691
Clarke .....	...	...	...	...		...	...
(Dr. Caldwell.)							
Bullock	183	23	2			183	208
Madison ...	110					110	110
Marshall	316	104	40	2	2	316	464
Sumter	125	23				125	148
(Dr. Grote.)							
Choctaw ...	1,285	488	115	13	1	1,285	1,902
Pickens	585	257	53	2		585	897
Totals ...	5,723	1,817	546	76	6	5,723	8,168

4. Laboratory Report:

(1) Number of specimens examined.....	639
(2) Number of specimens positive, hookworm.....	244
(3) Percentage of infection thus shown.....	38.1
(4) Number of doctors sending in specimens.....	78

5. Summary:

(1) Number of persons examined.....	27,806
(2) Number of persons treated by physicians.....	4,749
(3) Number of persons treated by staff:	
At dispensaries	5,723
At schools	676
(4) Total number of persons treated.....	11,148

III. Educating the people in sanitation.

1. By public lectures:

(1) Number of public lectures delivered.....	106
(2) Estimated number of persons thus reached.....	12,375

2. Through the schools:

(1) Number of teachers in state.....	9,220
(2) Number of teachers reached by visit.....	665
(3) Number of teachers reached by letter.....	389
(4) Number of teachers reached by bulletins.....	1,600
(5) Number of teachers reached at institutes.....	1,396

3. By bulletins, leaflets and special literature:
 - (1) Total number of bulletins and leaflets distributed...74,354
4. Through the public press:
 - (1) Number of papers in state..... 235
 - (2) Number of papers personally visited..... 63
 - (3) Number of letters to press..... 41
 - (4) Number of articles furnished for publication..... 136

IV. Notes on work of the year:

1. The total microscopic examinations and home inspections as shown on the report for field men does not tally with the report giving the infection and sanitary surveys by counties for the reason that a number of microscopic examinations and home inspections were made in counties where we did not succeed in completing these surveys; these incomplete surveys are not herein reported.

2. The State Superintendent of Education has issued instructions to county school trustees throughout the state that no state funds can be obtained for new school buildings unless the contract for same shall provide for two sanitary privies to be erected in accordance with plans and specifications furnished by the State Board of Health.

3. In the counties of Pickens, Marshall and Madison the county boards of education have issued orders that sanitary privies must be erected at the schools throughout the county. The trustees are ordered to provide for this by taxing each pupil not more than fifty cents per term. Plans and specifications for these privies are to be furnished by the State Board of Health.

In the counties of Barbour, Bibb, Bullock, Choctaw, Crenshaw, Henry and Sumter, school trustees in many districts adopted official resolutions recommending that their schools be provided with sanitary privies in accordance with the plans urged by the State Board of Health.

4. It is gratifying to report that county health officers have been more active than ever before, evinced by:

(a) Many letters of inquiry as to how they can best assist in the campaign in their county, and asking literature.

(b) Publishing of their reports in the county papers, giving the results of the hookworm campaign in their county.

(c) Assisting and securing county appropriations.

(d) Accompanying field men on county tours.

(e) Assisting in conducting dispensaries.

(f) Writing letters of endorsement addressed to county health officers in other counties.

5. In every county campaigned this year the doctors have taken more interest and have been more active than ever before. In every instance county societies have rendered indispensable service in launching their county campaigns, by resolutions endorsing the work and by addressing official requests to county courts of commissioners asking for the appropriations. The societies have also published in their local papers resolutions calling on the people to take advantage of the opportunities for treatment and cure offered by their local board of health in co-operation with the State Health Department.

6. Several county societies have arranged programs for their meetings calling for papers and discussions on hookworm disease, and the state campaign for its eradication.

Many individual doctors have made special trips throughout their communities urging the people to go to the dispensaries for examination and treatment. A number of such physicians have also assisted in conducting the dispensary and making microscopic examinations.

7. Deserving of special mention are two communities in Madison and Lauderdale counties, respectively, where minis-

ters and laymen joined in a voluntary Public Health Campaign. The local doctors backed up these movements very actively. The State Board of Health co-operated in these local campaigns, several lectures being given and large quantities of literature distributed.

8. School teachers, as usual, have responded with their characteristic zeal and sincere interest to all our requests for their co-operation. They have rendered indispensable service in getting school-children examined and treated. In three communities in Choctaw county, reported by Dr. Grote, three schools closed for the day, the teachers bringing all the children to the dispensary to be examined. In all instances a recess has been granted to allow the field man to deliver lectures on hookworm disease, sanitation, etc. The programs for teachers' institutes almost invariably call for lectures by representatives of this department.

9. County courts of commissioners and probate judges deserve special mention for their cordial support. The appropriations asked for have been cheerfully made in every case. In several instances the probate judges, acting for the revenue boards, have volunteered and made additional appropriations, after having seen so much good done by the campaign among the people.

In the 14 counties campaigned this year these courts have donated a total of \$1,475 to aid the work in the county campaigns.

ARKANSAS.

I. State survey by counties.

1. Infection survey, based on an examination of at least 200 children between the ages of 6 and 18 years, taken at random from the country:

County.	Area in Sq. miles.	Population.	Number examined.	Number infected.	Perctg. of infection.
Ashley	974	25,268	389	213	54.9
Cross	629	14,042	236	102	43.2
Drew	838	21,960	223	62	28.2
Hempstead....	722	28,285	526	197	37.6
Izard	611	14,561	1,116	685	61.4
LaFayette	524	13,741	329	235	28.6
Nevada	610	19,344	743	486	65.4
Sharp	606	11,688	219	45	20.5
Saline	750	16,657	358	130	33.0

2. Sanitary survey, based on an inspection of privy conditions at least 100 country homes.

County.	TYPE OF PRIVY.		
	E	F	Total
Cross	395	459	854
Hempstead	305	239	544
Izard	100	537	637
Jefferson	187	227	414
Lincoln	315	242	557
LaFayette	150	337	487
Saline	92	144	236
Sharp	65	326	391
Union	172	206	378
Woodruff	127	110	237

II. Getting the people treated.

1. Enlisting the physicians:

(1) Number of physicians in state.....	3,600
(2) Number of physicians personally interviewed.....	794
(3) Number of lectures to physicians.....	68
(4) Number of physicians thus reached.....	3,600
(5) Number of circular letters sent to physicians.....	8,028
(6) Number of bulletins sent to physicians.....	4,500
(7) Number of physicians now treating the disease....	608
(8) Number of persons treated by physicians.....	821

2. Getting the people to seek examination and treatment:

(1) Number of schools inspected.....	377
--------------------------------------	-----

- (2) Number of families examined.....
- (3) Number of persons examined:
 - Clinically 5,000
 - Microscopically 4,896
- (4) Total number of persons examined..... 9,896
- (5) Number of persons treated by field force..... 2,208
- (6) Total number of persons treated on record..... 3,029

3. Work of county dispensaries:

County.	Amount of Appropriation.	Amount used.	Duration of of campaign.
Cross .....	.....	.....	.....
Hempstead	\$25.00	\$4.34	4 weeks
Nevada	25.00	5.94	6 weeks
Izard	150.00	53.94	12 weeks
Union .....	.....	.....	.....
Others .....	.....	.....	.....
Hassig-Ellis Drug Co. do- nated)	50.00	25.10	.....
Totals	\$250.00	\$89.32	22 weeks

Number of persons and times treated.

County.	1	2	3	4	Total No. treated.	Total No. treatm'ts.
Cross	90	80	50		90	220
Hempstead.....	193	35	23		193	251
Nevada	307	55	25		307	387
Union	376	280	260		376	916
Izard	768	241	68	15	768	1,092
Others	474	118	47		474	639
	2,208	809	473	15	2,208	3,505

4. Report of laboratory:

- (1) Total number of specimens examined..... 600
- (2) Number containing hookworm ova..... 151
- (3) Average per cent. of infection.... 25.16
- (4) Number of other parasites..... 57
- (5) Number of mailing cases distributed..... 1,125
- (6) Number of mailing cases returned..... 600

5. Summary:

- (1) Number of persons examined..... 9,896
- (2) Number of persons treated by physicians..... 821
- (3) Number of persons treated by staff..... 2,208
- (4) Total number of persons treated..... 3,029

III. Educating the people in sanitation.

1. By public lectures:

- | | |
|--|--------|
| (1) Number of public lectures delivered..... | 190 |
| (2) Estimated number of persons reached..... | 49,883 |

2. Through the schools:

- | | |
|---|--------|
| (1) Number of teachers in state..... | 9,522 |
| (2) Number of teachers reached by visit..... | 650 |
| (3) Number of teachers reached by letter..... | 285 |
| (4) Number of teachers reached by bulletin..... | 10,175 |
| (5) Number of teachers reached at institutes..... | 6,475 |

3. By bulletins, leaflets and special literature:

- | | |
|---|--------|
| (1) Total number of bulletins and leaflets distributed..... | 48,102 |
|---|--------|

4. Through the public press:

- | | |
|--|-----|
| (1) Number of papers in state..... | 290 |
| (2) Number of papers personally visited..... | 75 |
| (3) Number of letters to press..... | 25 |
| (4) Number of articles furnished for publication.... | 212 |

IV. Notes on work of the year.

1. The following towns during 1912 have either adopted sewerage or dry bucket closet to some degree, with regulations concerning their care, and also have made attempts to improve and protect the water supply: Bauxite, Florence, Wabash, Magnolia, Helena, Stuttgart, Paragould, Jonesboro, Conway, Morrillton, Heber Springs, Eureka Springs, El Dorado, Waldron, Mariana, Searcy, Marion, Osceola, Batesville, Forrest City.

2. Return self-addressed postal cards to county superintendents, county examiners and physicians, out of sewer districts, requesting information relative to the construction of sanitary toilets for 1912 show reports from 39 counties, and 980 closets constructed therein. Most of the counties reporting are those in which the Commission has done most of its work. In spite of the fact that every effort was made to get a report from every county, the remaining 36 counties failed to respond. I am of the opinion that many

of these closets reported as sanitary are simply constructed with boxes and trap-doors, without being fly-proof. Many of them, however, will measure up to the 75% requirement.

3. As a result of addresses and appeals before various organizations the following actions were taken: The Arkansas State Teachers' Association adopted resolutions endorsing the work and creating a Teachers' Health League in every county in the State. The Arkansas Travelers promised hearty co-operation and urged that all hotels in the state build sanitary closets. The Hotel Proprietors' Association promised to comply as rapidly as possible and to aid the State Board of Health in passing a suitable health bill. The Arkansas Medical Society renewed its pledge of loyalty and commended the work. The Arkansas Federation of Women's Clubs enthusiastically endorsed the work and created Health Committees in every county where they have organizations, and are actively aiding in every way possible and are doing all in their power to force the passage of a satisfactory health bill. Various local societies and clubs have shown the same uniform courtesy and expressed appreciation of the good work being done.

GEORGIA.**I. State survey by counties.**

1. Infection survey, based on an examination of at least 200 children between the ages of 6 and 18 years, taken at random from the country:

County.	Area in Sq. miles.	Population.	Number examined.	Number infected.	Percgt. of infection.
Colquitt.....	565	13,636	659	578	87.0
Brooks.....	463	18,606	316	261	82.0
Berrien.....	810	19,440	200	183	91.5
Thomas.....	713	31,076	257	152	59.1
Ware.....	676	13,761	352	296	84.9
Macon.....	392	14,093	267	172	64.4
Muscogee.....	255	29,836	384	192	50.0
Worth.....	778	18,664	432	376	84.0
Wilkinson.....	431	11,440	439	404	92.0
Washington....	680	28,227	632	506	80.0
Pierce.....	518	8,100	849	742	87.0
Appling.....	775	12,336	433	331	76.4
Coffee.....	1,123	16,169	940	784	82.6
Houston.....	591	22,641	209	121	88.0

2. Sanitary survey, based on an inspection of privy conditions at least 100 country homes:

		TYPE OF PRIVY.		
County.	D	E	F	Total.
Berrien	2	600	118	720
Colquitt		312	58	370
Thomas	2	331	192	525
Ware		453	51	451
Macon		202	138	340
Crisp		182	28	210
Muscogee	5	211	106	322
Pierce		245	42	287
Coffee		355	21	376
Johnson		115	85	200

II. Getting the people treated.

1. Enlisting the physicians:

(1) Number of physicians in state.....	3,022
(2) Number of physicians personally interested.....	477
(3) Number of lectures to physicians.....	7
(4) Number of physicians thus reached.....	603
(5) Number of letters and circulars sent to physicians.....	5,739
(6) Number of bulletins sent physicians.....	6,732
(7) Number of physicians now treating the disease....	974
(8) Number of persons treated by physicians.....	6,887

2. Getting the people to seek examination and treatment:

(1) Number of schools inspected.....	0
(2) Number of persons examined clinically.....	0

- (3) Number of persons examined microscopically.....21,419
 (4) Number of persons treated by field force..... 10,324
 (5) Total number of persons treated on record.....17,213

3. Work of county dispensaries :

County.	Amount of Appropriation	Amount used.	Duration of campaign.
Lowndes.....	\$150.00	\$99.50	6 weeks
Thomas.....	150.00	117.44	7 weeks
Berrien.....	150.00	83.32	7 weeks
Colquitt.....	150.00	82.51	6 weeks
Brooks.....	150.00	60.32	6 weeks
Ware.....	150.00	69.10	6 weeks
Macon.....	150.00	70.69	6 weeks
Pierce.....	150.00	127.79	6 weeks
Camden.....	100.00	79.53	4 weeks
Appling.....	150.00	146.10	5 weeks
Coffee.....	150.00	137.26	6 weeks
Washington.....	150.00	104.02	7 weeks
Worth.....	150.00	147.79	6 weeks
Muscogee.....	150.00	140.73	7 weeks
Crisp.....	150.00	103.60	6 weeks
Wilkinson.....	150.00	81.13	6 weeks
Houston.....	150.00	146.31	6 weeks
Turner.....	150.00	88.44	5 weeks
Charlton.....	75.00	}	{ In operation
Clinch.....	75.00		
Burke.....	150.00		
Jefferson.....	150.00		
			Not open
			Not open

County.	Number of persons and times treated.					Total people treated.	Total treat- ments
	1	2	3	4	5		
Lowndes.....	122	42	20	0		122	184
Thomas.....	686	118	17	5		686	8,216
Berrien.....	819	81	16	1		819	917
Colquitt.....	650	93	17	7		650	767
Ware.....	429	126	12			429	567
Brooks.....	515	52	4			515	571
Macon.....	239	44	23	2		239	308
Washington..	832	168	22	1		832	1,186
Wilkinson....	653	114	25	4	3	48	653
Worth.....	762	76	2			762	840
Crisp.....	215	8	2	1		215	226
Pierce.....	1,114	307	15	1	1	1,114	1,438
Muscogee.....	307	81	23	8	3	307	422
Turner.....	347	52	6	1		347	406
Houston.....	211	10	1			211	222
Camden.....	401	105	16			401	522
Coffee.....	1,154	187	41	2		1,154	1,384
Totals ...	9,456	1,664	262	33	7	211	9,456
							11,633

4. Laboratory Report:
 - (1) Specimens examined2,985
 - (2) Specimens positive1,559
5. Summary:
 - (1) Number of persons examined21,419
 - (2) Number of persons treated by physicians 6,887
 - (3) Number of persons treated by staff10,324
 - (4) Total number of persons treated.....17,211

III. Educating the people in sanitation.

1. By public lectures:
 - (1) Number of public lectures delivered..... 334
 - (2) Number of persons thus reached (Estimated)....29,022
2. Through the schools:
 - (1) Number of teachers in state.....8,714
 - (2) Number of teachers reached by visit 17
 - (3) Number of teachers reached by bulletin
 - (4) Number of teachers reached at institutes.....1,165
 - (5) Number of teachers reached by letter..... 423
3. By bulletins, leaflets and special literature:
 - (1) Number of bulletins, leaflets, etc.....143,258
4. Through the public press:
 - (1) Number of papers in state.....311
 - (2) Number of papers personally visited..... 57
 - (3) Number of letters to press..... ..
 - (4) Number of articles furnished for publication..... 55

IV. Notes on work of the year.

1. The bill providing for county or district health officers and medical inspection of school children, while not receiving a constitutional majority, did receive a majority vote in the legislature of this year and helped to create public sentiment which will ultimately result in the enactment of this measure.

2. The boards of education in the following counties have passed resolutions adopting sanitary surface privies: Coffee, Camden, Charlton, Tift, Pierce and Ware.

3. As a result of our work in connection with women's clubs and other educational agencies, the attitude of the public toward all public health matters has been changed favorably; our chances for necessary legislation have been greatly enhanced.

KENTUCKY.

I. State survey by counties.

1. Infection survey, based on an examination of at least 500 persons, taken at random:

County.	Area in Sq. miles.	Population.	Number examined.	Number infected.	Perctg. of infection.
Bell.....	369	28,447	6,474	2,039	31.5
Breathitt.....	480	17,540	1,797	1,288	71.7
Butler.....	409	15,805	1,454	172	11.8
Clark.....	267	17,987	1,491	128	8.6
Edmonson....	260	10,469	2,723	1,541	56.6
Hickman.....	224	11,756	699	10	01.4
Jefferson.....	371	262,920	2,045	33	01.6
Knox.....	352	22,116	5,279	2,085	39.5
Leslie.....	397	8,976	590	277	46.9
Whitley.....	578	31,982	949	250	26.3
State institutions		1,437	1,437	198	13.8

2. Sanitary survey, based on an inspection of privy conditions at least 100 country homes:

County.	NUMBER OF PRIVY TYPES.						Total.
	A	B	C	D	E	F	
Bell				7	251	511	769
Breathitt	2				17	206	225
Butler				71	53	409	533
Clark				41	27	273	341
Edmonson.....					58	560	618
Hickman.....				67	82	124	273
Jefferson.....	1	3	5	126	189	232	556
Knox.....		2	1	41	117	138	299
Warren.....		2	3	67	112	188	372

II. Getting the people treated.

1. Enlisting the physicians:

(1) Number of physicians in state.....	3,708
(2) Number of physicians personally visited.....	2,358
(3) Number of lectures to physicians.....	66
(4) Number of physicians thus reached.....	1,854
(5) Number of letters and circulars to physicians.....	16,405
(6) Number of physicians now treating the disease....	1,125
(7) Number of persons treated by physicians.....	15,750

2. Getting the people to seek examination and treatment:

(1) Number of schools inspected.....	220
(2) Number of persons examined:	
Clinically	
Microscopically	22,841

- (3) Number of persons treated by field force..... 7,080
 (4) Number treated in State Institutions..... 198
 (5) Total number persons treated on record.....23,028

3. Work of county dispensaries:

Doctor and county.	Amt. of Co. appro.	Expendi- tures.	Duration of campaign.	Microscopic Pos.	Neg.	Total.
(Dr. Lock.)						
Bell.....	\$200.00	\$200.00	5 weeks	1,213	2,006	3,219
Knox.....	150.00	150.00	6 weeks	1,165	2,065	3,230
(Dr. Richmond.)						
Edmonson....	200.00	250.00	5 weeks	1,477	1,257	2,734
Jefferson....	750.00	750.00	5 weeks	337	1,418	1,755
(Dr. Shirley.)						
Breathitt.....	150.00	150.00	5 weeks	1,283	526	1,809
(Dr. Steele.)						
Butler	250.00	250.00	5 weeks	176	1,126	1,302
Totals....	\$1,700.00	\$1,750.00	31 weeks	5,651	8,398	14,049

Number of persons and times treated:

Doctor and county.	1	2	Total No. treated.	Total No. treatments.
(Dr. Lock.)				
Bell	1,340	26	1,340	1,366
Knox.....	1,926	29	1,926	1,955
(Dr. Richmond.)				
Edmonson	1,292	1	1,292	1,293
Jefferson.....	330	-	330	330
(Dr. Shirley.)				
Breathitt.....	1,298	13	1,298	1,311
(Dr. Steele.)				
Butler	167	13	167	180
Totals	6,353	82	6,353	6,435

4. Report of laboratory:

- (1) Total number of specimens examined.....31,006
 (2) Number specimens sent in by physicians.....21,962
 (3) Number sent in by dispensaries..... 2,693
 (4) Number sent in by individuals..... 461
 (5) Number containing hookworm ova.....10,356
 (6) Number negative to hookworm.....20,635

Note.—997 Specimens from Knox County sent to laboratory for examinations.

- | | |
|---|--------|
| (7) Number specimens negative to parasites..... | 15,643 |
| (8) Number of specimens containing <i>Ascaris Lumbric.</i> | 7,255 |
| (9) Number of specimens containing <i>Trichiuria Tri-</i>
<i>chiuris</i> | 2,546 |
| (10) Number containing <i>Hymenolepis Nana</i> | 626 |
| (11) Number of mailing cases distributed..... | 30,382 |
| (12) Number of mailing cases returned..... | 15,282 |
5. Summary:
- | | |
|---------------------------------|--------|
| (1) Number of persons examined: | |
| At the laboratory..... | 31,006 |
| At the dispensaries..... | 14,049 |
| (2) Number treated: | |
| By physicians..... | 15,750 |
| By staff..... | 7,080 |
| In State Institutions..... | 198 |

III. Educating the people in sanitation.

- | | |
|---|---------|
| 1. By public lectures: | |
| (1) Number of public lectures delivered..... | 480 |
| (2) Estimated number persons thus reached..... | 80,122 |
| 2. Through the schools: | |
| (1) Number of teachers in state..... | 9,487 |
| (2) Number of teachers reached by visit..... | 1,035 |
| (3) Number of teachers reached by letter..... | 6,750 |
| (4) Number of teachers reached by bulletin..... | .... |
| (5) Number teachers reached at institutes..... | 4,250 |
| 3. By bulletins, leaflets and special literature: | |
| (1) Total number of bulletins and leaflets distributed..... | 179 130 |
| 4. Through the press: | |
| (1) Number of papers in the state..... | 1,640 |
| (2) Number of papers personally visited..... | 70 |
| (3) Number of letters to press..... | 1,650 |
| (4) Number of articles furnished for publication..... | 1,943 |

IV. Notes on work of the year.

1. This is Kentucky's first year in the work. We are grateful to workers in the other states for many plans of procedure which had already been perfected for our use.

2. The Kentucky sanitary privy has become practicable. We offer definite plans for a septic tank for schools and country homes; it can be built at small cost; it is water-tight, fly-proof, devoid of bad odors and sanitary

3. Repeated tests by re-examination and a careful check system have shown that the method of microscopic examination devised by our State force is more rapid and more accurate than examination without the centrifuge.

4. In no other respect has this work been of more value than in bringing to the attention of physicians the growing importance of accurate methods of diagnosis. During the year physicians of the state treated 15,750 cases of hook-worm disease; of these 15,075, or 96%, were diagnosed microscopically. During the year these physicians treated 17,471 cases of tuberculosis; of these only 5,265 were confirmed microscopically. They treated 19,125 cases of gonorrhea; of these only 3,127 had been diagnosed microscopically. They treated 12,375 cases of diphtheria; of these only 1,350 had been confirmed microscopically. The state laboratory is at the service of the physicians of the state; it is confidently believed that during 1913 a much larger percentage of laboratory examinations in other diseases will be made.

5. In a remarkable degree we have had the co-operation of every agency working for good in Kentucky:

(a) The officers and members of the State Board of Health have given us a kind of support without which our work would have been impossible. One day of the annual school for county health officers was devoted to our work; the instruction there given reached all of the 120 counties in the state; our state bacteriologist has personally supervised the training of our 10 microscopists; she has held herself personally responsible for the accuracy of their work; a portion of each of her public addresses is devoted to this work; she secured the county appropriation in one of our dispensary counties. The vital

statistics organization, with a lay representative in practically every school district in the state, has been of incalculable service in our work. Dr. Heizer, the registrar of vital statistics, personally visited the local registrars in each dispensary county in the early part of the work so as to secure their live interest in it. He has emphasized in all his public addresses the economic loss from hookworm morbidity as altogether out of proportion to the apparent death rate from the disease. The Secretary of the State Board of Health has been present in person during a part of each of our dispensary campaigns; he has used the results of the work as a basis for the program for the future health work in the state. The president and members of the board have each visited some of the county dispensaries and have given an amount of moral support to the work without which it could not have been successful.

(b) Of even greater importance has been the co-operation of the Kentucky State Medical Association, with its 114 county medical societies and the medical profession of the state. In the six counties worked the physicians have contributed 492 days to this service without compensation. When it is understood that less than 25 cases of hookworm disease had been treated in Kentucky prior to January 1, 1911, nothing better shows the spirit of our doctors than that 1,125 of them have gone on record as treating 15,750 cases in their private practice in the past twelve months. The Kentucky State Medical Association pays the salary of one microscopist; this young woman acts as reporter for the Kentucky Medical Journal, so that all physicians in the state are kept informed as to the progress of the work.

(c) Our county health officers, the medical superintendents of our state eleemosynary institutions and physicians in charge

of mining and other industrial plants have rendered special service. The county health officer has been present at no less than one-half of the dispensary appointments, and in Jefferson and Knox counties at all of them. If charged for at the ordinary per diem rate the annual salaries of neither of these men would pay for their services during the dispensary alone. To give but a few concrete examples of such service, Dr. W. E. Ray, the health officer of Leslie county, attended the annual school for county health officers in Louisville; recognized from the addresses on hookworm disease that his people were infected with it; returned home and secured authority from his fiscal court to purchase a stereopticon; with slides furnished by us he lectured all over his county and, with the co-operation of Dr. Collins, his only colleague, sent in 590 specimens from the most prominent people of the county, of which one-half were found infected. He got Dr. Heizer to deliver an address before the county teachers' institute to an audience representing practically the entire county. The fiscal court, in direct response to Dr. Ray's campaign, appropriated \$300 for the dispensary. In the same spirit Doctors Menifee, of Grant, and Piper, of Logan counties, and many others, have secured stereopticons and are making telling inroads on the preventable diseases in their counties.

(d) The co-operation of county officials has been prompt and aggressive. We have found that it is only necessary to explain our work in plain English to the county judges and magistrates to secure adequate appropriations of money and to secure their moral support and personal co-operation in these campaigns. As an example, Judge Stampler, of the Bell County Court, attended the annual school for county health officers: became enthused by it; returned home and set his

people on fire with a desire to secure the benefits of health. He preached sermons in the churches; taught lessons in schools to pupils, teachers and parents; explained the purposes of the campaign to groups of men working on the public roads; went out into the hustings with the cry for more and better life on his lips and made of the dispensary campaign in Knox county a success in better health for his people in such way as to entitle him to their confidence and enduring esteem. In Breathitt county J. W. Hagans, the County Judge, or W. H. Blanton, the County Attorney, or both, accompanied Dr. Shirley and his microscopists on horse-back or on a hand-car to every one of their appointments. One of these men made addresses each time Dr. Shirley did, and with equal or greater effect, because they were talking to their own people, who knew them and loved them. In Edmonson county John A. Logan, the County Attorney, personally guaranteed the appropriation for the dispensary work; built the first sanitary privy in the county at his own house; submitted specimens for examination from every member of his family and co-operated in such way as to secure the examination of one-third of the entire population of the county. Squire Durbin gave a barbecue on the first dispensary day and led his neighbors and life-time friends in the movement for better health conditions. At Bee Springs, in this county, Michael Vincent, State Senator; H. T. Rich, ex-Representative, and J. C. Van Meter, the local registrar of vital statistics, as committee on arrangements devoted days in preparing for the dispensary at that point and made this the largest dispensary we have ever held in a purely rural community.

In Bell and Butler counties the magistrates and physicians co-operated in the same way. At several dispensaries practi-

cally every physician in the county was present and helped in the work.

Jefferson county, the richest and most populous county in the State, has taken up the work with the determination to push it until intestinal parasites have been eradicated. The work will be conducted systematically by districts and will require months for its completion. The fiscal court has voted \$600, and has promised to finance the work until the job is done. The co-operation of the fiscal court, of the county board of health, of the full time county health officer, with his laboratory, with his bacteriologist and his sanitary inspectors, of the county board of education, of the teachers, of the commercial bodies of Louisville and the citizenship of the county give promise of making this campaign historic.

(e) The State Press Association has been at our service; it has carried life saving information daily and weekly to every newspaper reading family in Kentucky.

(f) We have had the hearty co-operation of the State Superintendent of Education, county school superintendents and public school teachers. One teacher in Leslie county, 40 miles from a railroad and 20 miles from his county seat, sent to the state laboratory specimens from his 25 pupils; 24 of them were found infected. Being miles from a physician he treated these 24 pupils himself, and, in his own words, "made live pupils out of dead ones." More than 20 country schools in the state have had a specimen from every pupil examined; more than 500 have had a majority of their pupils examined; more than 1,000 soil pollution charts of the United States Public Health Service have been distributed among country school teachers; many of the schools use the bulletin of the State Board of Health as a text book. Next year the State

Department of Education at its own expense will place in the hands of every public school child a text book on hygiene, written by our state registrar of vital statistics. This book will contain a chapter on hookworm disease, another chapter on the sanitary privy, and will be profusely illustrated with pictures.

(g) We have had the active co-operation of the State Federation of Women's Clubs, an organization which guides the public activities of the women of Kentucky. Our state bacteriologist is an officer of the state organization and every assistant in her laboratory is a member. One-half of the attendance at our dispensaries at Barbourville, Corbin, Pineville, Middlesboro, Jackson, Morgantown and the towns in Jefferson county has been secured through the activity of the organized women's clubs. These women have been active in sending in specimens from their own families and securing the examination and treatment of their neighbors. Fifty women, the wives or daughters of the most prominent men in the state, were present at the meeting of our State Medical Association to hear the address delivered by the chairman of their health committee. They came as an earnest of their real desire to be of practical assistance in this co-operative campaign.

LOUISIANA.

I. State survey by counties.

1. Infection survey, based on an examination of at least 200 children between the ages of 6 and 18 years, taken at random from the country:

Parish.	Area in Sq. miles.	Population.	Number examined.	Number infected.	Percntg. of infection.
Claiborne	764	23,029	203	66	32.0
Livingston.....	626	8,100	1,270	725	57.0
Morehouse.....	809	16,634	252	48	19.0
Rapides.....	1,370	39,578	397	124	31.2
St. Helena.....	409	8,479	1,461	750	51.3
St. Landry.....	1,662	52,906	475	30	6.3
Tangipahoa.....	777	17,625	1,250	616	49.2
Vernon.....	1,321	10,327	2,038	1,351	66.2
Webster.....	682	15,125	549	153	27.8
Winn.....	957	9,648	341	177	48.0

2. Sanitary survey, based on an inspection of privy conditions at least 100 country homes:

Parish.	TYPE OF PRIVY.						Total.
	A	B	C	D	E	F	
Claiborne.....	2	2	9	15	213	375	616
Livingston.....				52	241	163	456
Morehouse.....			6	28	408	187	629
Rapides.....				4	224	260	488
St. Helena.....				9	191	150	350
St. Landry.....		22	21	52	1,665	459	2,219
Tangipahoa.....	2	20	18	112	266	30	448
Vernon.....		103		6	1,270	349	1,728
Webster.....					309	328	637
Winn.....		2	2		79	346	429

II. Getting the people treated.

1. Enlisting the physicians:

(1) Number of physicians in state.....	2,033
(2) Number of physicians personally interviewed.....	377
(3) Number of lectures to physicians.....	3
(4) Number of physicians thus reached.....	100
(5) Number circular letters sent to physicians.....	11,863
(6) Number of bulletins sent to physicians.....	660
(7) Number of physicians now treating the disease...	161
(8) Number of persons treated by physicians.....	5,342

2. Getting the people to seek examination and treatment:
- (1) Number of schools inspected..... 298
 - (2) Number of persons examined:
 - Clinically36,769
 - Microscopically 8,877
 - (3) Total number of persons examined.....45,646
 - (4) Number of persons treated by field force.....17,543
 - (5) Total number of persons treated on record.....22,885

3. Work of county dispensaries:

Doctor and Parish.	Amount of appro.	Expenditures.	Duration of campaign.
--------------------	------------------	---------------	-----------------------

(Dr. Wright.)

Claiborne.....	\$150.00	\$150.00	6 weeks
Morehouse.....	200.00	200.00	6 weeks
Webster.....	150.00	150.00	6 weeks
Ouachita*.....	200.00	.....	.....
	<u>\$700.00</u>	<u>\$500.00</u>	<u>18 weeks</u>

(Dr. Adams.)

Feliciana*.....	100.00		
Livingston.....	100.00	100.00	6 weeks
St. Helena.....	100.00	100.00	6 weeks
Tangipahoa.....	100.00	100.00	7 weeks
	<u>\$400.00</u>	<u>\$300.00</u>	<u>19 weeks</u>

(Dr. Baucum.)

La Salle*.....	150.00		
Rapides.....	150.00	150.00	7 weeks
Winn.....	183.00	183.00	6 weeks
	<u>\$483.00</u>	<u>\$333.00</u>	<u>13 weeks</u>

(Dr. Azar.)

Vernon.....	330.00	330.00	6 weeks
Grand totals.....	<u>\$1,913.00</u>	<u>\$1,463.00</u>	<u>56 weeks</u>

(Dr. Wright.)

Claiborne.....	1,113	712	195	6		1,113	2,026
Morehouse.....	425	71	12			425	508
Webster.....	631	513	150	11	I	631	1,306
	<u>2,169</u>	<u>1,296</u>	<u>357</u>	<u>17</u>	<u>I</u>	<u>2,169</u>	<u>3,840</u>

*Dispensary work just begun.

Doctor and Parish	Number of persons and times treated.					Total No. treated	Total No. treatm'ts
(Dr. Adams.)	1	2	3	4	5		
Livingston.....	985	565	196	11		985	1,757
St. Helena.....	766	512	251	21		766	1,550
Tangipahoa.....	1,226	670	327	4	4	1,226	2,231
	<u>2,977</u>	<u>1,747</u>	<u>774</u>	<u>36</u>	<u>4</u>	<u>2,977</u>	<u>5,538</u>
(Dr. Baucum.)							
Rapides.....	1,207	713	133	21	2	1,207	2,076
Winn.....	2,283	910	77	7		2,283	3,277
	<u>3,490</u>	<u>1,623</u>	<u>210</u>	<u>28</u>	<u>2</u>	<u>3,490</u>	<u>5,353</u>
(Dr. Azar.)							
Vernon.....	2,384	1,347	669	53	2	2,384	4,455
Grand totals..	11,020	6,013	2,010	134	9	11,020	19,186

4. Work of laboratory:

(1) Number of specimens examined.....	659
(2) Number of specimens positive, hookworm.....	126
(3) Percentage of infection thus shown.....	19.1

5. Summary:

(1) Number persons examined.....	45,646
(2) Number treated by:	
Physicians	5,342
Staff	17,543
(3) Total number treated.....	22,885

III. Educating the people in sanitation.

1. By public lectures:

(1) Number of public lectures delivered.....	407
(2) Estimated number of persons thus reached.....	33,999

2. Through the schools:

(1) Number of teachers in state.....	6,403
(2) Number of teachers reached by visit.....	894
(3) Number of teachers reached by letter.....	1,200
(4) Number of teachers reached by bulletins.....	4,000
(5) Number of teachers reached at institutes.....	1,360

3. By bulletins, leaflets and special literature:

(1) Number of bulletins distributed.....	62,265
--	--------

4. By the public press:

(1) Number of papers in state.....	198
(2) Number of papers personally visited.....	60
(3) Number of letters to press.....	572
(4) Number of articles furnished for publication.....	51

IV. Notes on work of the year.

1. The State legislature enacted the following:

(a) House Bill No. 268. AN ACT to further carry into effect Articles 296 and 297 of the Constitution of the State of Louisiana and to preserve the public health; to authorize the State Board of Health to revise the Sanitary Code, etc.

Section 3 of the above Act prescribes that fines shall be imposed for violation of any regulation contained in the Sanitary Code.

Section 4 prescribes that said fines shall be paid into the treasury of the state to the credit of the State Board of Health.

The appropriation for the State Board of Health was increased from \$25,000 to \$40,000 per annum.

(b) ACT No. 173 confers the same rights upon municipal and parish boards of health, with the following proviso:

"They shall act under the supervision and advice of the State Board of Health and pass no ordinance in conflict or inconsistent with the powers and duties of the State Board of Health, but shall in all health and sanitary measures which they may adopt be auxiliary to and act in harmony with the State Board of Health, and shall make such reports monthly to said Board of Health and furnish such other information as the State Board may require."

(c) ACT No. 131. Exempting Board of Health from paying costs of court.

ACT No. 161. Establishing State Tuberculosis Commission and prescribing that the President and Secretary of the State Board of Health shall be members of said Commission, etc.

2. During the year the State Board of Health has promulgated regulations providing for:

- (a) Abolishing common drinking cup and roller towel.
- (b) Election of State Registrar of Vital Statistics.
- (c) Local food, drug and sanitary inspectors without compensation.
- (d) Anti-diphtheretic serum in the interest of the poor.
- (e) A State Sanitary engineer.

3. The following parishes passed regulations providing for sanitary privies: Avoyelles, Bienville, Calcasieu, Caldwell, Ouachita, St. Bernard, St. Helena, St. Tammany, Tangipahoa. Number of sanitary privies built, 825.

4. Morehouse Parish increased the salary of the parish health officer \$750 per annum, and prescribed that an inspection of all schools should be made semi-annually. Livingston Parish health officer devoting his full time to public health work.

MISSISSIPPI.

I. State survey by counties.

1. Infection survey, based on an examination of at least 200 children between the ages of 6 and 18 years, taken at random from the country:

County.	Area in Sq. miles.	Population.	Number examined.	Number infected.	Perctg. of infection.
Perry.....	1,091	14,682	767	610	70.0
Hancock.....	611	11,886	710	504	70.0
Lincoln.....	574	21,552	1,159	824	71.0
Covington.....	577	13,076	1,041	830	79.0
Forrest.....			906	740	81.0
Simpson.....	578	12,800	1,375	1,021	74.0
Smith.....	610	13,055	150	141	94.0
Union.....	418	16,522	959	490	51.0
Chickasaw.....	507	19,892	112	26	23.0
Alcorn.....	402	14,987	255	218	85.0
Tippah.....	456	12,983	497	294	59.0
Lafayette.....	673	22,110	134	35	26.0
Amite.....	708	20,708	1,147	856	74.0
Pike.....	697	27,545	1,099	672	61.0
Wilkinson.....	664	21,453	476	345	72.0
Copiah.....	748	34,395	1,041	493	47.0
Winston.....	577	14,124	374	319	85.0
Clarke.....	664	17,741	244	221	90.0
Leake.....	561	17,360	769	563	73.0
Lauderdale.....	677	38,150	284	210	73.0
Franklin.....	555	18,678	1,655	1,267	76.0
Jackson.....	1,073	16,513	960	855	89.0
Greene.....	819	6,795	1,349	1,158	85.0
Jasper.....	647	15,394	1,170	920	78.0
Wayne.....	788	12,539	1,578	1,418	89.0
Kemper.....	704	20,492	336	255	75.0

2. Sanitary survey, based on an inspection of privy conditions at least 100 country homes:

County.	TYPE OF PRIVY.					Total.
	B	C	D	E	F	
Perry.....				12	192	204
Hancock.....				53	373	426
Union.....				26	106	132
Chickasaw.....				106	123	229

Alcorn.....		81	13	94*
Marshall.....		65	200	265
Lafayette.....		26	399	425
Tippah.....		36	144	180
Lincoln.....		21	38	59*
Covington.....		64	246	310
Forrest.....		93	143	236
Simpson.....		29	297	326
Smith.....		2	190	192
Amite.....		289	315	604
Pike.....		504	55	559
Wilkinson.....		340	27	367
Copiah.....		345	0	345
Franklin.....	20	384	786	1,190
Jackson.....	35	512	833	1,380
Jefferson.....	15	158	152	310
Greene.....	8	236	651	895
Winston.....		158	151	309
Clarke.....	I	159	123	284
Leake.....		170	284	454
Lauderdale.....		235	234	469
Jasper.....		92	265	357
Wayne.....		143	323	466
Kemper.....		73	169	242

II. Getting the people treated.

1. Enlisting the physicians:

- (1) Number of physicians in state..... 1,783
- (2) Number of physicians personally interviewed..... 905
- (3) Number of lectures to physicians..... 16
- (4) Number of physicians thus reached..... 643
- (5) Number of circular letters sent to physicians..... 8,794
- (6) Number of bulletins sent to physicians..... 16,456
- (7) Number of physicians now treating the disease.... 1,206
- (8) Number of persons treated by physicians..... 10,201

2. Getting the people to seek examination and treatment:

- (1) Number of schools inspected..... 699
- (2) Number of families examined..... 11,104
- (3) Number of persons examined:
 - Clinically 11,214
 - Microscopically 39,267
- (4) Number of persons treated by field force..... 33,977

*Survey not completed.

3. Work of county dispensaries:

Doctor and County.	Amt. of appro.	Amt. used.	Duration of campaign.	Microscopic. Pos. Neg.	Clinical. Pos. Neg.	Total Exams.
(Dr. Rowan.)						
Perry.....	\$125.00	\$134.00	7 weeks	610 157	428 153	1,348
Hancock.....	150.00	162.75	7 weeks	321 137	64 117	639
(Dr. Boswell.)						
Alcorn.....	264.38	272.38	6 weeks	245 81	42 8	376
Union.....	100.00	132.19	6 weeks	841 1,110	621 176	2,748
Chickasaw.....			4 weeks	98 386		484
Tippah.....	125.00	124.36	11 weeks	604 1,015	569 153	2,341
Marshall.....			2 weeks	1 37	4 3	45
Lafayette.....	200.00		1 week	34 95		129
(Dr. Whitefield.)						
Lincoln.....	250.00	250.00	8 weeks	1,291 858		2,149
Covington.....	200.00	127.81	12 weeks	1,232 622	17	1,871
Forrest.....	209.50	209.50	10 weeks	1,329 1,027	14	2,370
Simpson.....	214.85	214.85	10 weeks	1,350 772	1	2,123
Smith.....	200.00		3 weeks	169 36	10	215
(Dr. Buchanan.)						
Amite.....	200.00	190.00	4 weeks	1,381 888	1,892 257	4,418
Pike.....	213.85	213.85	8 weeks	1,186 1,289	2,010 440	4,925
Wilkinson.....	200.00	150.00	7 weeks	496 336	501 293	1,626
Copiah.....	200.00		10 weeks	496 580	104 75	1,255

Doctor and County.	Amt. of appo.	Amt. used.	Duration of campaign.	Microscopic. Pos.	Neg.	Clinical. Pos.	Neg.	Total Exams.
(Dr. Howard.)								
Winston.....	249.23	249.23	7 weeks	1,055	947	587	2	2,591
Clarke.....	258.75	258.75	4 weeks	961	191	1,015		2,167
Leake.....	200.00	196.74	9 weeks	733	349	934	80	2,096
Lauderdale.....	200.00		4 weeks	316	147	375	47	885
(Dr. Dedwylder.)								
Franklin.....	200.00	197.00	7 weeks	2,293	1,362		1	3,656
Jackson.....	200.00	192.00	7 weeks	1,419	705			2,124
Greene.....	175.00	175.00	8 weeks	1,457	480			1,937
Jefferson.....	200.00		1 week	(Nothing done.)				
(Dr. Gill.)								
Jasper.....	200.00	199.15	5 weeks	1,359	410	182	39	1,990
Wayne.....	240.00	225.80	7 weeks	1,686	506			2,192
Kemper.....	200.00		3 weeks	355	179			534
Neshoba.....	200.00							
Oktibbeha.....	200.00							
Hinds.....	200.00							
Totals	\$5,775.56	\$3,875.36	178 weeks	23,318	14,702	9,370	1,844	49,234

Doctor and County.	No. of persons and times treated.					Total No. treated.	Total No. treatments
	1	2	3	4	5	6	7
(Dr. Boswell.)							
Alcorn.....	780	452	315	17	4	1	780
Tippah.....	910	413	169	13	3	1	910
Union.....	1,395	750	296	29	6	3	1,395
Totals.....	3,085	1,615	780	59	13	5	3,085
(Dr. Buchanan.)							
Amite.....	3,220	2,019	2,487	34	39	39	3,220
Wilkinson.....	1,556	1,288	1,255				1,556
Pike.....	3,145	2,381	2,055				3,145
Copiah.....	589	577	577				589
Totals.....	8,510	7,165	6,374	34	39	39	8,510
(Dr. Dedwylder.)							
Franklin.....	2,759	1,927	1,097	4			2,759
Jackson.....	1,408	1,147	856				1,408
Greene.....	1,454	1,361	1,343	5			1,454
Totals.....	5,621	4,435	3,296	9			5,621
(Dr. Gill.)							
Jasper.....	1,619	1,019	246				1,619
Wayne.....	1,722	1,692	1,467				1,722
Kemper.....	375	375	375				375
Totals.....	3,716	3,686	2,088				3,716

Doctor and County.	1	2	No. of persons and times treated.				6	7	Total No. treated.	Total No. treatments
			3	4	5					
(Dr. Howard)										
Winston.....	1,543	1,303	813	5	1				1,543	3,665
Clarke.....	2,177	2,177	1,759	35	11				2,177	6,159
Leake.....	1,785	1,783	1,764						1,785	5,332
Lauderdale.....	703	703	492						703	1,898
Totals	6,208	5,966	4,828	40	12				6,208	17,054
(Dr. Rowan.)										
Perry.....	801	792	792	403	4				801	2,792
Hancock.....	715	676	667	306	8				715	2,372
George.....										68
Totals	1,516	1,468	1,459	709	12				1,516	5,232
(Dr. Whitfield.)										
Lincoln.....	1,302	1,286	1,052						1,302	3,640
Covington.....	1,367	1,213	1,143	59	25				1,367	3,808
Forrest.....	1,236	1,024	975	29	22				1,236	3,286
Simpson.....	1,241	1,050	1,030	11	9				1,241	3,347
Smith.....	175	83	74	1					175	333
Totals	5,321	4,656	4,274	100	56				5,321	14,414

4. Laboratory Report:

(1) Total number of specimens examined.....	1,273
(2) Number containing hookworm ova.....	1,247
(3) Number containing other parasites.....	26

5. Summary:

(1) Number of persons examined.....	50,507
(2) Number of persons treated by physicians.....	10,201
(3) Number of persons treated by staff.....	33,977
(4) Total number persons treated.....	44,178

III. Educating the people in sanitation.

1. By public lectures:

(1) Number of public lectures delivered.....	1,034
(2) Estimated number of persons reached.....	97,795

2. Through the schools:

(1) Number of teachers in state.....	10,166
(2) Number of teachers reached by visit.....	731
(3) Number of teachers reached by letter.....	1,273
(4) Number of teachers reached by bulletin.....	all
(5) Number of teachers reached at institutes.....	977

3. By bulletins, leaflets and special literature:

(1) Total number of bulletins and leaflets distributed.....	224,997
---	---------

4. Through the press:

(1) Number of papers in state.....	234
(2) Number of papers personally visited.....	172
(3) Number of letters to press.....	1,306
(4) Number of articles furnished for publication.....	1,055

IV. Notes on work of the year

1. The 1912 legislature enacted:

(a) A law requiring the M. D. degree from a reputable medical college before being admitted to the licensing examination for the practice of medicine.

(b) A law requiring the reporting of births and deaths of the entire state.

(c) A law increasing the appropriation from \$8,000 to \$22,500 per annum.

2. The State Board of Health has promulgated a sanitary code regulating the sanitary conditions of hotels, restaurants,

meat markets, dairies, depots, trains and other places of public utility, and also relative to vital statistics.

3. The following towns have passed ordinances requiring sanitary closets: Blue Mountain, Morton and Collins. During the year 727 sanitary privies have been built.

4. The work of the present year has shown a decided gain as compared with that of last year. The entire scope of the work of the State Board of Health has been enlarged, which is evidenced by the fact that when the campaign was started for the eradication of hookworm disease in June, 1910, the quarters of the State Board of Health consisted of two rooms, and there was but little equipment with which to work. There was no State Board of Health laboratory, and the Bureau of Vital Statistics had not been created by legislative enactment. Very little attention had been given to municipal inspection, and the improvement of the sanitation of towns and cities throughout the state. The citizenship of the state, in large measure, had given but little consideration to questions of public health of state-wide importance. The organization of the health interests of the state was practically untouched and the various agencies that can be used for the advancement of a higher order of civilization by the improvement of the sanitary environment of the people of the state had not been enlisted in this important and far-reaching movement.

There has come a change in the affairs of the state, and today the quarters of the State Board of Health consist of the entire floor of one of the main office buildings of Jackson. There is a splendidly equipped laboratory, which is well manned, and during its second year of existence 4,491 specimens of typhoid fever, tuberculosis, malaria, hookworm and other diseases have been examined. The Bureau of Vital Sta-

tistics has been organized upon a most efficient basis and is in charge of a well trained statistician who is securing results. The position of Chief Sanitary Inspector has been created, the purpose of which is to have a competent physician and sanitarian inspect systematically all towns and cities of the state of 500 inhabitants and over. This position was filled on June 1st, and since that time an aggressive and most effective campaign has been waged for improving municipal sanitation. It is the subject of general comment that marked results have been achieved and much improvement effected in the sanitation of hotels, restaurants, meat markets, slaughter-houses, dairies, depots, railroad coaches and other places of public utility. There is perhaps no Southern state doing this work more systematically than is being done in Mississippi.

5. The standard of the medical profession has also been elevated by the enactment of a law requiring every student of medicine to have a medical degree from a reputable medical college before being allowed to practice. The State Board of Health is also vigilant and thoroughly imbued with the idea of protecting the standard of the medical profession.

6. In general the health interests of the state have been thoroughly organized, and today there is perhaps no community or portion of the state that has not been awakened to the importance of a higher type of citizenship as a result of an improved sanitary environment. The various agencies of the state have been enlisted as never before in a state-wide campaign for the betterment of the health conditions of all the people, and, as a consequence, results have been accomplished.

NORTH CAROLINA.

I. State survey by counties.

1. Infection survey, based on an examination of at least 200 children between the ages of 6 and 18 years, taken at random from the country:

County.	Area in Sq. miles.	Population.	Number examined.	Number infected.	Perctg. of infection.
Anson.....	461	25,465	1,345	427	31
Beaufort.....	819	30,887	423	280	66
Bertie.....	618	23,039	1,539	743	48
Bladen.....	900	18,006	257	131	50
Buncombe.....	520	49,798	1,103	257	23
Carteret.....	520	13,776	1,333	860	54
Catawba.....	440	27,918	1,119	514	45
Chowan.....	240	11,303	544	220	40
Cleveland.....	420	29,494	2,532	1,036	40
Craven.....	900	25,594	1,509	828	54
Edgecombe.....	515	32,010	1,149	421	38
Franklin.....	420	24,692	855	296	34
Gaston.....	346	37,063	2,763	1,130	41
Gates.....	360	10,455	889	318	35
Greene.....	300	13,083	544	270	49
Harnett.....	840	22,174	763	362	47
Henderson.....	366	16,262	811	481	58
Iredell.....	650	34,315	1,976	537	27
Jones.....	450	8,721	791	452	57
Lee.....	360	11,376	742	520	70
Lenoir.....			633	315	48
Lincoln.....	300	17,132	2,209	853	39
Martin.....	500	17,797	457	227	47
Nash.....	520	43,727	1,448	731	50
New Hanover....	199	32,037	268	147	51
Richmond.....	472	19,673	1,600	650	40
Rutherford.....	470	28,385	1,215	622	51
Scotland.....	387	15,363	195	74	38
Stokes.....	500	20,151	1,222	946	78
Surry.....	600	29,709	1,699	1,002	59
Wilkes.....	700	30,282	1,429	1,121	77
Wilson.....		24,269	1,576	876	55
Yadkin.....	320	15,428	1,443	1,098	76

2. Sanitary survey, based on an inspection of privy conditions at at least 100 country homes:

NUMBER OF PRIVY TYPES.				
County.	D	E	F	Total.
Anson.....		141	94	235
Beaufort.....		222	341	563
Bertie.....		283	172	455
Carteret.....		88	62	150
Chowan.....	2	117	137	256
Craven.....		159	204	363
Franklin.....		71	95	166
Gates.....		216	195	411
Henderson.....		52	67	119
Lee.....		160	97	257
Martin.....		257	247	504
Nash.....		113	74	187
New Hanover.....		203	154	357
Richmond.....	2	80	102	184
Scotland.....		195	199	394
Stokes.....		88	339	427
Surry.....		124	485	609
Watauga.....		39	120	159
Wilkes.....	2	144	314	460
Yadkin.....		32	267	299

II. Getting the people treated.

1. Enlisting the physicians:

(1) Number of physicians in state.....	1,720
(2) Number of physicians personally visited.....	1,145
(3) Number of lectures to physicians.....	10
(4) Number of physicians thus reached.....	168
(5) Number of circular letters sent to physicians....	8,622
(6) Number of prescription pads sent to physicians....	330
(7) Number of physicians treating the disease.....	1,307
(8) Number of persons treated by physicians.....	15,859

2. Getting the people to seek examination and treatment:

(1) Number of schools inspected.....	197
(2) Number of persons examined:	
Clinically	1,978
Microscopically	135,867
	<hr/>
(3) Number of persons treated by field force.....	137,845
	42,132

EXAMINATIONS.

3. Work of county dispensaries:

Doctor and county.	Amt. of Co. app.	Expenditures.	Duration of campaign.	Microscopic Pos.	Microscopic Neg.	Clinical Pos.	Clinical Neg.	Total.
(Dr. Page.)								
Johnson.....	\$250.00	\$250.00	7 weeks	1,758	2,063	44		3,865
(Dr. Pridgen.)								
New Hanover*.....	300.00	133.45	3 weeks	287	191	797	1,028	2,303
Beaufort.....	300.00	248.57	9 weeks	2,675	1,660			4,335
Wake.....	250.00	252.00	6 weeks	1,006	1,566			2,632
Wilkes.....	300.00	300.00	4 weeks	4,396	3,450			7,846
Surry.....	275.00	275.00	6 weeks	1,819	3,188			5,007
Yadkin.....	250.00	238.05	6 weeks	2,016	2,431			5,347
Stokes.....	250.00	193.60	4 weeks	1,860	1,584			3,444
Lee	200.00	158.00	4 weeks	928	1,088			2,016
Totals	\$2,125.00	\$1,804.67	42 weeks	15,947	15,158	797	1,028	32,030
(Dr. Strosnider.)								
Craven.....	300.00	101.13	8 weeks	1,138	1,472	3		2,613
Carteret.....	200.00	150.00	4 weeks	1,194	1,475			2,669
Greene.....	200.00	140.40	5 weeks	440	796			1,236
Lenoir.....	200.00	158.20	5 weeks	590	876			1,466
Burke.....	250.00	238.86	6 weeks	994	2,584	3		3,581
Yancey.....	250.00	190.57	6 weeks	137	835	1		973
Iredell	256.86	256.86	9 weeks	808	3,469			4,277
Totals.....	\$1,656.86	\$1,326.02	43 weeks	5,301	11,507	7		16,815

NORTH CAROLINA.

71

Doctor and county.	Amt. of Co. app.	Expenditures.	Duration of campaign.	Microscopic	Clinical	Total.
				Pos.	Pos. Neg.	
(Dr. Covington.)						
Bertie.....	\$283.46	\$283.46	10 weeks	1,448	67 33	4,069
Edgecombe.....	268.41	268.41	6 weeks	618	1	2,535
Nash.....	200.00	196.29	6 weeks	1,170		3,308
Catawba.....	204.48	204.48	8 weeks	1,776	1	6,498
Caldwell.....	252.31	252.31	7 weeks	1,783		5,066
Richmond.....	250.00	222.73	8 weeks	971		2,681
Anson.....	200.00	230.46	5 weeks	586		3,009
Totals.....	\$1,748.66	1,748.14	50 weeks	8,352	69 33	27,166
(Dr. Hughes.)						
Chowan*.....	200.00	148.95	2 weeks	486		1,575
Gates.....	200.00	140.35	7 weeks	499		2,034
Martin.....	200.00	194.33	6 weeks	849		2,447
Duplin.....	200.00	171.14	5 weeks	1,438		2,615
Jones.....	200.00	130.05	5 weeks	868		2,065
Cleveland.....	299.38	299.38	6 weeks	1,770		7,247
Rutherford.....	250.00	299.08	6 weeks	1,263		5,084
Scotland.....	300.00	185.08	4 weeks	250		890
Totals.....	\$1,849.38	\$1,568.36	41 weeks	7,363		23,897
(Dr. Leonard.)						
Wilson.....	250.00	223.70	6 weeks	1,710		3,716
Gaston.....	250.00	248.06	6 weeks	1,398		6,031
McDowell.....	250.00	192.80	6 weeks	913		1,994
Buncombe.....	250.00	236.99	6 weeks	330		1,948
Henderson**.....	250.00	199.15	3 weeks	590		1,712
Totals.....	\$1,250.00	\$1,100.70	27 weeks	4,941		15,401
*Part of work reported last year.						
**Work not yet complete.						

**Work not yet complete.

*Part of work reported last year.

Doctor and county.	Amt. of Co. app.	Expenditures.	Duration of campaign.	Microscopic Pos. Neg.	Clinical Pos. Neg.	Total.
(Dr. Jacobs.)						
Lincoln.....	\$250.00	\$277.59	8 weeks	1,359	4,144	5,503
Watauga.....	200.00	142.43	4 weeks	8	768	776
Franklin.....	250.00	215.00	5 weeks	429	1,302	1,731
Totals.....	\$700.00	\$635.02	17 weeks	1,796	6,214	8,010
Summary:						
Dr. Page*.....	\$250.00	\$250.00	7 weeks	1,758	2,063	3,865
Dr. Pridgen.....	2,125.00	1,804.67	42 weeks	15,947	15,158	32,930
Dr. Strosnider.....	1,656.86	1,326.02	43 weeks	5,301	11,507	16,815
Dr. Covington.....	1,748.66	1,748.14	50 weeks	8,352	18,712	27,166
Dr. Hughes.....	1,849.38	1,568.36	41 weeks	7,303	16,534	23,897
Dr. Leonard*.....	1,250.00	1,100.70	27 weeks	4,941	10,460	15,401
Dr. Jacobs*.....	700.00	635.02	17 weeks	1,796	6,214	8,010
Totals.....	\$9,579.90	\$8,432.91	227 weeks	45,458	80,648	128,084
Counties which have made necessary appropriation and are now on waiting list for dispensaries:						
Wilson.....		\$250.00				
Forsyth.....		250.00				
Hoke.....		200.00				
Union.....		250.00				
Amount of county appropriations (1911).....		Available.				
Amount of county appropriations (1912).....		\$4,300.00				
Amount of county appropriations (1912).....		9,579.90				
Amount of county appropriations (1912).....		1,700.00				
Totals.....		\$15,579.90				
*Dr. Page resigned February 17; Dr. Leonard began work May 1; Dr. Jacobs began August 1.						
						\$11,748.57

Amount expended.
\$3,315.66
8,432.91
(Counties not yet worked)

Amount expended.
\$3,315.66
8,432.91
(Counties not yet worked)

Doctor and county.	Number of persons and times treated.									Total number of treatments.
	1	2	3	4	5	6	7	8	9	
(Dr. Page.)										
Johnson.....	1,708	74	17	3						1,802
(Dr. Pridgen.)										
New Hanover*.....	780	260	36	8	6	1				1,084
Beaufort.....	1,196	826	595	51	16					2,675
Wake.....	795	662	606	49	10					2,128
Wilkes.....	3,431	2,877	2,825	621	190	20	6	2	2	9,983
Surry.....	1,590	1,577	1,549	212	36	12	1	1		4,978
Yadkin.....	2,533	2,476	2,450	222	47	22	9			7,759
Stokes.....	1,585	1,538	1,533	27	8	1				4,602
Lee.....	775	729	727	30	2					2,203
Totals.....	12,685	10,945	10,321	1,220	314	56	16	3	2	35,562
(Dr. Strosnider.)										
Craven.....	1,142	854	575	72						2,643
Carteret.....	1,194	825	543	10						2,572
Greene.....	440	355	247	21						1,063
Lenoir.....	590	467	274	3	16					1,334
Burke.....	902	560	232	64						1,774
Yancey.....	113	52	13	5						183
Iredell.....	808	733	514	52	3					2,110
Totals.....	5,189	3,846	2,398	227	19					11,679

NORTH CAROLINA.

Doctor and county.	1	2	3	4	5	6	7	8	9	Total number of treatments.
(Dr. Covington.)										
Bertie.....	1,549	661	349	51						2,610
Edgecombe.....	639	427	271	7						1,344
Nash.....	1,170	752	286	29	10	1				2,248
Catawba.....	1,756	1,130	385	81	10					3,362
Caldwell.....	1,707	1,069	653	100	21					3,610
Richmond.....	965	594	399	142	33	13	7			2,153
Anson.....	588	381	298	111	22	1				1,401
Totals	8,434	5,014	2,641	521	96	15	7			16,728
(Dr. Hughes.)										
Chowan*.....	487	133	27	1						648
Gates.....	499	264	79	11						853
Martin.....	849	499	231	30	4					1,613
Duplin.....	1,438	886	341	38	1					2,704
Jones.....	868	469	196	18	1					1,492
Cleveland.....	1,770	1,204	703	74	11					3,852
Rutherford.....	1,262	998	453	48	7	1				2,769
Scotland.....	249	161	57	4	3					474
Totals	7,362	4,704	2,087	224	27	1				14,405

*Part of work reported last year.

Doctor and county.	1	2	3	4	5	6	7	8	9	Total number of treatments.
(Dr. Leonard.)										
Wilson.....	1,546	1,111	799	10	4	1				3,471
Gaston.....	1,503	1,210	1,035	26						3,774
McDowell.....	904	743	641	24	4					2,316
Buncombe.....	328	301	200	1	1					921
Henderson*.....	556	189	75							820
Totals.....	4,837	3,554	2,840	61	9	1				11,302
(Dr. Jacobs.)										
Lincoln.....	1,461	1,087	881	4						3,433
Watauga.....	16	8	8							32
Franklin.....	440	401	387	1						1,229
Totals.....	1,917	1,496	1,276	5						4,694
Summary.										
Dr. Page.....	1,708	74	17	3						1,802
Dr. Prigden.....	12,685	10,945	10,321	1,220	314	56	16	3	2	35,562
Dr. Strosider.....	5,189	3,846	2,398	227	19					11,679
Dr. Covington.....	8,434	5,014	2,641	521	96	15	7			16,728
Dr. Hughes.....	7,362	4,704	2,087	224	27	1				14,405
Dr. Leonard.....	4,837	3,554	2,840	61	9	1				11,302
Dr. Jacobs.....	1,917	1,496	1,276	5						4,694
Totals.....	42,132	29,633	21,580	2,261	465	73	23	3	2	96,172

*Work not yet complete.

Comparative Summary.

PERSONS TREATED.

	By physicians.	By staff.	Total.
1910.....	8,000		8,000
1911.....	16,709	29,172	45,881
1912.....	15,859	42,132	57,991
Totals	40,568	71,304	111,872

MICROSCOPIC EXAMINATIONS.

	Laboratory.	Co. dispensaries.	Total.
1910.....	7,949		7,949
1911.....	20,115	17,213	37,328
1912.....	9,761	126,106	135,867
Totals	37,825	143,319	181,144

4 Work of Laboratory for 1912:

	March.	Quarter ending.		Dec.	Total
	31	June.	Sept.	31	
Number of specimens examined.....	3,266	2,870	2,122	1,503	9,761
Showing some form of infection.....	1,217	852	572	409	3,037
Number of specimens negative.....	2,049	2,027	1,550	1,107	6,733
Specimens showing hookworm ova.....	814	718	427	335	2,294
Specimens showing ascaris*.....	336	102	95	29	562
Specimens showing hymenolepis.....	46	32	60	36	174
Specimens showing trichocephalus.....	126	5	0	3	134
Specimens showing strongyloides.....	9	14	23	2	46
Specimens showing oxyuris.....	0	3	1	1	5
Specimens showing T. saginata.....	1	3	2	0	6
Specimens showing balantidium.....	0	0	1	1	2
5. Summary:					
(1) Number of persons examined.....					137,845
(2) Number treated by physicians.....					15,859
(3) Number treated by staff.....					42,132
(4) Total number treated.....					57,991

*The infection by intestinal parasites other than the hookworm are given in this report for 9,761 laboratory examinations, but not for the 126,106 examinations made in the field. The hookworm infection in the laboratory is 23%; in the field 35%. This ratio for the other intestinal infections will certainly hold for the field work. The ascaris indeed seems to be even more prevalent.

III. Educating the people in sanitation.

1. By public lectures:
 - (1) Number of public lectures delivered..... 454*
 - (2) Estimated number of persons thus reached..... 36,849
2. Through the schools:
 - (1) Number of teachers reached by visit..... 197
 - (2) In the dispensary campaign the field directors have reached the teachers and other influential citizens by letters numbering more than..... 20,000
 - (3) They have also distributed handbills numbering more than..... 250,000
3. By bulletins, leaflets and other literature:
 - (1) Number of bulletins distributed (hookworm disease) 340
 - (2) Number of leaflets distributed (hookworm disease) 45,246
 - (3) Number of hookworm pamphlets distributed... 75,619
 - (4) Number of sanitary privy pamphlets distributed. 58,865
 - (5) Number of pieces of other State Board of Health literature distributed..... 135,000 plus
4. Through the public press:
 - (1) Number of papers in state..... 310
 - (2) Number of papers personally visited..... 175
 - (3) Number of visits..... 425
 - (4) Number of letters to press..... 2,300
 - (5) Number of articles furnished for publication... 319
 - (6) Other literature or letters:
 - Letters to superintendents of schools..... 209
 - Letters to county commissioners..... 482
 - Letters to registers of deeds..... 100

IV. Notes on work of the year.

1. The North Carolina campaign against hookworm disease for 1912 has progressed with gratifying results along lines similar to those pursued the latter months of 1911. In that division of the work directed to the treatment of sufferers the people three years ago were found ignorant of the disease or apathetic toward it. They have progressed rapidly through a conversant stage and are now in the midst of a stage of activity. This means that something definite, something worth while, is being accomplished. Generally speaking, we regret

*Does not include dispensary lectures.

to say that in matters pertaining to preventing the disease by stopping soil pollution the people have not yet proceeded beyond the conversant stage, but at the same time the progress made has been remarkable.

2. For every day of the year 1912, excepting Sundays, an average of 434 persons have been microscopically examined, making a total of 135,867 persons; and to the 42,132 of these found infected, 96,176 treatments have been dispensed by members of our staff who, in no instance, made a charge or accepted pay from the patients.

3. Of 1,700 active physicians in the state 1,307 have sent in reports indicating that they have treated during the year 15,859 persons. Their work, added to that of the State Board of Health's staff, gives 57,991 persons treated. For 1910 the number was 8,000; for 1911 it was 45,881. To date treatment has been administered to 111,872 persons.

4. The number of microscopic examinations was, for 1910, 7,949; 1911, 37,328; 1912, 135,867, a total to date of 181,144 examinations.

5. The number of microscopic examinations made, rather than the number of persons treated, affords the best index as to the progress of the work, because in lightly infected areas there may be great enthusiasm and an immense amount of work done, and yet the number actually found infected may be comparatively small. In Yadkin county, for example, 34 per cent of the entire population was examined; in Lincoln county, 32 per cent; in Wilkes, 25 per cent, and to examine one person out of every five living in a county is not unusual. In lightly infected counties greater effort is required to get the people to come to the dispensaries.

6. The counties appropriate \$200 to \$300 to pay for advertising the county campaign; the cost of medicine; the tin boxes for the specimens, and the traveling expenses of the microscopists. Thus far 60 counties have appropriated \$15,579.90, an average of \$259.66 per county. In working in 54 counties \$11,670.57 of county funds have been spent, an average of \$216.12 for each county. Nothing in excess of what was actually used was drawn out of the county treasury. Six counties are now on the waiting list to have the dispensary work; and Wilson county has made a second appropriation to have the work renewed. Commissioners in quite a number of counties have expressed a desire to have the work a second time.

7. The growth of this feature of the work is interesting:

No. of coun- ties making appropria- tion.	Amount of county funds made available.	Amount of county funds actually spent.
1911.....17	\$4,300.00	\$3,315.66
1912.....43 (for counties completed)	9,529.90	8,354.91
(counties on waiting list)	1,750.00	
<hr/> 60	<hr/> \$15,579.90	<hr/> \$11,670.57

8. The personnel of those who are engaged in this work is given on page 8 of this report. Two physicians and two microscopists are paid by the state; the others are paid with funds furnished by the Rockefeller Sanitary Commission through the State Board of Health.

9. The work accomplished stands as the best evidence that every organized agency is taking a hand in the work. The press has encouraged the work in many ways, the educational

forces have been active, and the doctors as a rule have been enthusiastic and magnanimous in their attitude. The work accredited to them in this report tells of but a small part of what they have done. The County Commissioners have listened to the appeal of the helpless and made this great free work possible. Numerous specific statements from them and from doctors who have seen the work in progress have been printed in a small pamphlet and will be gladly sent to any one on request to the State Director.

SOUTH CAROLINA.

I. State surveys by counties.

1. Infection survey, based on an examination of at least 200 children between the ages of 6 and 18 years, taken at random from the country:

County.	Area in Sq. miles.	Population.	Number examined.	Number infected.	Perctg. of infection.
Dillon.....			496	292	57
Horry.....	1,075	23,364	375	222	86
Marlboro.....	509	27,639	234	104	43
Oconee.....	641	23,634	256	95	38
Orangeburg....	1,345	59,663	647	352	54
Spartanburg....	762	65,560	788	245	31

2. Sanitary survey, based on an inspection of privy conditions at least 100 country-homes:

County.	TYPE OF PRIVY.						Total.
	A	B	C	D	E	F	
Calhoun.....					98	109	207
Chester.....	4		2	10	144	52	212
Chesterfield.....	3				124	148	275
Colleton.....					89	129	218
Darlington.....	4				260	223	487
Dillon.....					181	136	317
Florence.....					89	115	204
Georgetown.....					69	131	200
Horry.....		I			46	290	337
Edgefield.....					157	119	276
Lancaster.....					108	150	258
Laurens.....					104	101	205
Marlboro.....	4				156	129	289
Oconee.....					67	138	205
Orangeburg.....					141	152	293
Sumter.....					120	80	200
Williamsburg.....					89	144	233
York.....					106	117	223

II. Getting the people treated.

1. Enlisting the physicians:

(1) Number of physicians in state.....	1,113
(2) Number of physicians personally interviewed.....	411
(3) Number of lectures to physicians.....	10
(4) Number of physicians thus reached.....	1,200
(5) Letters and circulars sent to physicians.....	3,200
(6) Number of bulletins sent to physicians.....	500
(7) Number of physicians reporting treating disease..	624

2. Getting the people to seek examination and treatment:

- (1) Number of schools inspected..... 53
- (2) Number of persons examined clinically.....42,502
- (3) Number of persons examined microscopically.....13,872
- (4) Total number of persons examined.....56,374
- (5) Number of persons treated at dispensaries.....25,270
- (6) Number of persons treated by physicians.....10,840
- (7) Total number of persons treated on record.....36,110

3. Work of county dispensaries:

County.	Amount appropriated.*	Amount used.	Duration of campaign.
Bamberg.....	\$50.00	\$18.00	6 weeks
Calhoun.....	50.00	24.75	6 weeks
Chester.....	50.00	30.00	6 weeks
Chesterfield.....	50.00	30.00	6 weeks
Colleton.....	50.00	59.42	5½ weeks
Darlington.....	50.00	49.50	8 weeks
Dillon.....	50.00	13.50	9 weeks
Edgefield.....	50.00	15.75	6 weeks
Florence.....	50.00	56.25	7 weeks
Georgetown.....	50.00	9.90	12 weeks
Horry.....	75.00	73.95	9 weeks
Lee.....	50.00	32.00	6 weeks
Lexington.....	50.00	25.00	6 weeks
Marlboro.....	50.00	9.00	6½ weeks
Oconee.....	50.00	20.00	8 weeks
Orangeburg.....	50.00	51.20	10½ weeks
Richland.....	50.00	9.90	7 weeks
Spartanburg.....	50.00	30.00	6 weeks
Sumter.....	50.00	15.75	7 weeks
Williamsburg.....	50.00	27.00	6 weeks

*Money could be appropriated to defray cost of medicine only. When appropriation was exceeded, deficit was made good by county.

Doctor and county.	Number of persons and times treated.						Total No. people treated.	Total No. treatments.
	1	2	3	4	5	6		
(Dr. Routh.)								
Calhoun....	1,032	271	82	6			1,032	1,391
Colleton....	2,081	459	360	27	2		2,081	2,929
Edgefield...	571	82	10	1			571	664
Orangeburg...	3,650	638	344	40			3,650	4,672
Bamberg....	809	386	116	19	6	1	809	1,337
Totals...	8,143	1,836	912	93	8	1	8,143	10,993

(Dr. Riser.)								
Chester.....	798	194	139	10			798	1,141
Lexington...	747	506	451	312	2		747	2,018
Totals...	1,545	700	590	322	2		1,545	3,159

(Dr. Rodgers.)

Chesterfield.	1,788	654	538	470	27		1,788	3,477
Darlington..	3,711	1,050	591	65			3,711	5,417
Dillon.....	695	136	195	56			695	1,082
Marlboro....	244	45	30	6			244	325
Oconee.....	788	536	430	383	17	1	788	2,155
Richland....	151	136	126	6			151	419
Totals...	7,377	2,557	1,910	986	44	1	7,377	12,875

(Dr. Howell.)

Florence....	2,228	702	612	22	3		2,228	3,567
Horry.....	2,224	1,033	697	143	5		2,224	4,102
Lee.....	1,009	679	444	191	20	1	1,009	2,434
Spartanburg.	442	400	359	288	16		442	1,505
Williamsb'g.	1,728	686	457	59	8	3	1,728	2,941
Totals...	7,631	3,500	2,569	703	52	4	7,631	14,549

(Dr. Weinberg.)

Georgetown	118	68	38	19			118	243
Sumter.....	366	216	105	30	5		366	722
Totals...	484	284	143	49	5		484	965

4. Laboratory report:

Specimens examined.....	2,090
Specimens positive.....	480

5. Summary:

(1) Number of persons examined.....	56,374
(2) Number of persons treated by physicians.....	10,840
(3) Number of persons treated by staff.....	25,270
(4) Number of persons treated on record.....	36,110

III. Educating the people in sanitation.

1. By public lectures:

(1) Number of lectures delivered.....	90
(2) Estimated number of persons reached by these lectures	5,400

2. Through the schools:

(1) Number of teachers in the state.....	4,255
(2) Number of teachers reached by visit.....	50
(3) Number of teachers reached by letter.....	500
(4) Number of teachers reached by bulletin or leaflet.	1,000
(5) Number of teachers reached at institutes.....	600

3. By bulletins, leaflets and special literature:

(1) Number of bulletins and leaflets distributed.....	100,100
---	---------

4. Through the public press:

(1) Number of papers in the state.....	156
(2) Number of papers personally visited.....	81
(3) Number of letters to the press.....	50
(4) Number of articles furnished for publication.....	77

IV. Notes on work of the year.

1. The 1912 legislature enacted the following law:

"Sec. 1. Be it enacted by the General Assembly of the State of South Carolina that the Executive Committee of the State Board of Health shall have the power to make, adopt, promulgate and enforce reasonable rules and regulations from time to time requiring and providing for the thorough sanitation and disinfection of all passenger cars, sleeping cars, steamboats and other vehicles of transportation in this state, and also of all convict camps, penitentiaries, hotels, schools and other places used by or open to the public; to provide for the care, segregation and isolation of persons having, or suspected of having, any communicable, contagious or infectious disease; to regulate the method of disposition of garbage or sewage and any like refuse matter in or near any incorporated town, city or unincorporated town or village of the state; to provide for the thorough investigation and study of the causes of all diseases, epidemic and otherwise in this state, and the means for the prevention of contagious disease, and the publication and distribution of such information as may contribute to the preservation of the public health and the prevention of disease; to make separate orders and rules to meet any emergency not provided for by general rules and regulations, for the purpose of suppressing nuisances dangerous to the public health, and communicable, contagious and infectious diseases and other dangers to the public life and health;

Provided, however, That nothing herein contained shall be construed as in any way limiting any duty, power or powers now possessed by or heretofore granted to the said State Board of Health or its Executive Committee by the Statutes of this state, or as affecting, modifying or repealing any rule or regulation heretofore adopted by said Board.

A violation of any rule is punishable by a fine of \$100 or 30 days' imprisonment.

TENNESSEE.

I. State survey by counties.

1. Infection survey, based on an examination of at least 200 children between the ages of 6 and 18 years, taken at random from the country:

County	Area in Sq. miles.	Population.	Number examined.	Number infected.	Perct. infected.
Carter.....	345	16,688	200	131	65
Johnson.....	290	10,589	200	34	10.7
Washington.....	325	22,604	200	42	21
Cumberland.....	548	8,311	200	143	61
Putnam.....	430	16,890	243	111	45.6
Jackson.....	325	15,039	292	143	48.9
McMinn.....	437	19,163	521	282	54.1
Franklin.....	610	20,392	210	69	32.8
Hamilton.....	427	51,695	646	165	24.0
Marion.....	504	17,271	434	166	38.0

2. Sanitary survey, based on an inspection of privy conditions at least 100 country homes:

County.	C	TYPE OF PRIVY.			Total
		D	E	F	
Carter.....	0	19	72	109	200
Johnson.....	1	18	93	88	200
Washington.....	3	32	71	94	200
Cumberland.....	0	00	10	258	268
Putnam.....	0	00	00	202	202
Jackson.....	0	00	30	170	200
McMinn.....	0	2	76	121	200
Franklin.....	0	1	106	121	228
Hamilton.....	0	0	78	128	206
Marion.....	0	0	25	175	200

II. Getting the people treated.

1. Enlisting the physicians:

(1) Number of physicians in state.....	3,449
(2) Number of physicians personally visited.....	940
(3) Number of lectures to physicians.....	22
(4) Number of physicians thus reached.....	984
(5) Number of circular letters to physicians.....	8,784
(6) Number of bulletins sent to physicians.....	1,051
(7) Number of physicians treating the disease.....	279
(8) Number of persons treated by physicians.....	584

2. Getting the people to seek examination and treatment:

(1) Number of schools inspected	238
(2) Number of homes inspected	2,765

(3) Number of families examined	1,437
(4) Number of persons examined clinically.....	17,574
(5) Number of persons examined microscopically.....	16,038
(6) Number of specimens positive	5,532
(7) Total Number of persons examined.....	33,612
(8) Number of persons treated by field force.....	3,842
(9) Total number of persons treated on record.....	5,103

3. Work of county dispensaries:

County.	Amt. of Appro.	Duration of Campaign.
Clay.....	\$25.00	30 days
Carter.....	100.00	47 days
Johnson.....	200.00	48 days
Washington.....	200.00	32 days
White.....	150.00	22 days
Cumberland.....	75.00	43 days
Putnam.....	150.00	35 days
McMinn.....	150.00	40 days
Marion.....	150.00	59 days
Franklin.....	25.00	8 days
Hamilton.....	150.00	59 days
Totals.....	\$1,375.00	423 days

3. Work of county dispensaries:

County and Doctor	No. of persons and times treated.						Total No. people treated.	Total No. treat-ments.
	1	2	3	4	5	6		
Clay.....								
Pickett.....								
Fentress (Lansden).....	885	361	111	24	5	2	885	1,388
Carter (Yancey).....	537	276	125	3	2	0	537	943
Johnson (Yancey).....	220	227	95	3	2	0	220	547
Marion (Lacey).....	492	206	12	2	0	0	492	732
Marion (Lee).....	59	22	1	0	0	0	59	82
Marion (Robinson).....	12	24	16	0	0	0	12	52
Franklin (Lee).....	37	16	5	0	0	0	37	58
Franklin (Robinson).....	31	31	28	0	0	0	31	90
Washington (Yancey).....	68	45	50	0	0	0	68	163
White (Breeding).....	160	6	00	0	0	0	160	166
Cumberl'd (Breeding).....	514	196	9	0	0	0	514	719
Putnam (Breeding).....	73	16	0	0	0	0	73	89
McMinn (Lee).....	421	284	145	4	0	0	421	850
Warren (Lee).....	69	40	7	0	0	0	69	163
Hamilton (Lacey).....	264	183	47	14	4	2	264	514
Totals.....	3,842	1,933	651	50	13	4	3,842	6,556

4. Report of Laboratory.

(1) Total number of specimens examined.....	897
(2) Number containing hookworm ova	144
(3) Number containing Tricocephalus dispar.....	78
(4) Number containing Oxyuris vermicularis	12

(5) Number containing <i>Ascaris lumbricoides</i>	165
(6) Number containing <i>Taenia nana</i>	36
(7) Number containing <i>Taenia saginata</i>	3
(8) Number containing <i>Amoeba coli</i>	78
(9) Number containing <i>Strongyloides intestinalis</i>	1
(10) Number containing Fly larvae	1
(11) Number containing <i>Bacillus tuberculosis</i>	5

5. Summary:

(1) Number of persons examined	33,612
(2) Number of persons treated by physicians	584
(3) Number of persons treated by staff.....	4,579
(4) Number of persons treated.....	5,103

III. Educating the people in sanitation.

1. By public lectures:

(1) Number of public lectures delivered.....	118
(2) Estimated number of persons reached.....	20,264

2. Through the schools:

(1) Number of teachers in state	9,233
(2) Number of teachers reached by visit	871
(3) Number of teachers reached by letter	1,357
(4) Number of teachers reached by bulletins	1,167
(5) Number of teachers reached at institutes	2,562

3. By bulletins, leaflets and special literature:

(1) Total number of bulletins and leaflets distributed..	59,797
--	--------

4. Through the press:

(1) Number of papers in state	252
(2) Number of papers personally visited	67
(3) Number of letters to press.....	66
(4) Number of articles furnished for publication.....	101

IV. Notes on work of the year.

1. The State and District Directors have been received by the physicians of the State with uniform kindness and a number of physicians have been very active in their support. It is known that many cases of hookworm disease are being treated by individual physicians after clinical diagnosis and we get no direct reports of most of these cases. In fact, we have been able to get very few reports of cases treated from the doctors of the State. However, it is believed that the medical profession of Tennessee, taken as a whole, is sup-

porting our work and we make grateful acknowledgement of the help that has come to us from this source.

2. It has been a constant aid to take advantage of every opportunity to get into touch with the people. The dispensaries have been our most valuable aid to this end and they have accomplished as much as could reasonably be expected. Five counties made appropriations for the free dispensaries in 1911 and 15 are now on the list, 10 having been added in 1912. Some question has been raised in a number of counties as to the legal right of the county courts to appropriate moneys for dispensary purposes. In some of the counties appropriations can be made at only one sitting of the court in the year, and none of the courts sit oftener than once in three months. These courts are generally large bodies and the amount of work necessary to get the matter of appropriating money before them with a reasonable promise of successful outcome is not an insignificant matter. The average time consumed in the operation of the dispensaries has been greater than we would have it be, but the effort has been to do the work thoroughly and with fairness to every part of each county.

3. The schools of the State have had their doors open to us. The State Superintendent of Public Instruction, the Assistant Superintendent, the State High School Inspector, the Presidents of the three State Normal Colleges, County Superintendents and other educational officers have been our active allies and have encouraged our work in every possible way. The State and District Directors have been given prominent places on the programs of Teachers' Institutes, Educational Rallies and other meetings of public nature. The County Superintendents have usually accompanied the field men

through their respective counties; County Boards of Education have lent encouragement, and the teachers have nearly all done what they could to help.

4. The Board of Education of the progressive little mountain city of Cookeville, in Putnam county, headed by Dr. W. Scott Farmer, has expended \$1,500 for sanitary improvement and has established a course of Hygiene and Sanitation in the schools. This course is conducted by Dr. Farmer and other local physicians, and visiting speakers are impressed into service to help the good work along. Drs. Breeding and West have been allowed to help in this movement. The benefits are already apparent, more than two hundred of the children having been examined for hookworm disease and the medicine for treating those found infected has been given them. This places Cookeville in the lead of other cities of the State of like size in the matter of sanitary improvement in the schools.

5. The little city of Jellico, another mountain town, in Campbell county, has made great improvement in the city school, having put in a sewer system connected with the new city sewer. Medical inspection has been carried out in the Middle Tennessee Normal College, located at Murfreesboro. The examination of the students of the State institution for the blind is now under way. The famous Webb School, at Bell Buckle, has been examined for the second time. Part of the student body at Castle Heights School at Lebanon has been examined. An orphanage located in a Middle Tennessee town has had all of the children examined and treatment was given to all infected individuals.

6. A special train for educational purposes was operated over all the railroads of the State by the State Department of Agriculture and the various railroad companies. One car in

this train was given over to public health demonstrations and an exhibit on hookworm disease and sanitation was given a prominent place. This car was visited by 200,000 persons and the hookworm exhibit attracted wide attention.

7. Bulletins and leaflets have been widely distributed throughout the whole State and many more requests for literature have been received this year than ever before. Tennessee Senators and Congressmen have supplied us with generous supplies of literature which has been used to good advantage.

8. The Farmers' Institutes, conducted by the State Department of Agriculture in the three Grand Divisions of the State, are large and influential bodies and the attendance has been larger this year than ever before. The State Director has appeared before all these institutes. The Department of Agriculture has been most kind and helpful and has made it possible for our work to be brought directly to the attention of great numbers of our people.

9. County health officers in Tennessee are doing better work than has heretofore been done. The State Health Officers' Association in April was addressed by Doctors Rose, Freeman, Porter, Leathers and Stiles of the Commission's forces. The meeting was a grand success and foretold good things for the future.

10. Because of an absolute lack of funds since March 1st the State Board of Health has been unable to furnish the financial assistance extended in former years. The Secretary of the Board, Dr. R. Q. Lillard; the Assistant Secretary, Dr. H. H. Shoulders, and all employees of the State Board of Health have done whatever they could to further our work and have extended every courtesy to the Assistant Secretary.

TEXAS.**I. State survey by counties.**

1. Infection survey, based on an examination of at least 200 children between the ages of 6 and 18 years, taken at random from the country:

County and Doctor.	Area in sq. miles.	Pop.	Number examined.	Number infected.	Per cent. infected.
Jasper (Ferrell)...	977	7,138	1,016	603	59.3
Angelina (Ferrell)...	881	13,481	1,096	820	74.8
Hardin (Ferrell)...	844	5,049	1,114	669	60.6
Montg'ry (Hoch)...	1,066	17,067	999	700	70.7

2. Sanitary survey, based on an inspection of privy conditions at at least 100 country homes:

County and Doctor.	TYPE OF PRIVY.						Total No. inspected.
	A	B	C	D	E	F	
Jasper (Ferrell).....	0	0	0	0	9	220	229
Angelina (Ferrell).....	0	0	0	0	48	135	183
Hardin (Ferrell).....	0	0	0	0	48	253	301
Montgomery (Hoch).....	0	1	0	8	90	410	509

II. Getting the people treated.

1. Enlisting the physicians:

(1) Number of physicians in state.....	5,789
(2) Number of physicians personally interested.....	490
(3) Number of lectures to physicians.....	3
(4) Number of letters and circulars sent to physicians.....	6,422
(5) Number of bulletins sent to physicians.....	2,500
(6) Number of physicians now treating the disease....	519
(7) Number of persons treated by physicians.....	3,210

2. Getting the people to seek examination and treatment:

(1) Number of schools inspected	25
(2) Number of homes inspected .....	..
(3) Number of families examined .....	..
(4) Number of persons examined clinically	0
(5) Number of persons examined microscopically ....	..
(6) Number of specimens positive	4,262
(7) Total number of persons examined.....	..
(8) Number of persons treated by field force.....	4,262
(9) Total number of persons treated on record.....	7,472

3. Work of county dispensaries:

County and Doctor.	Amt. of Appro.	Expenditures.	Duration of Campaign.
Jasper (Ferrell).....	\$300.00	\$220.40	6 weeks
Angelina (Ferrell).....	300.00	266.80	6 weeks
Hardin (Ferrell).....	300.00	285.00	6 weeks
Montgomery (Hoch).....	300.00	287.77	6 weeks
Totals.....	\$1,200.00	\$1,059.97	24 weeks

County and Doctor.	No. of persons and times treated.			No. people treated.	Total No. treat- ments.
	1	2	3		
Jasper (Ferrell).....	803	264	65	0 803	1,133
Angelina (Ferrell)	1,081	303	43	0 1,081	1,427
Hardin (Ferrell).....	1,140	339	33	0 1,140	1,512
Montgomery (Hoch)	1,238	147	21	1 1,238	1,407
Totals.....	4,262	1,053	163	1 4,262	5,479

4 Report of Laboratory.

(1) Total number of specimens examined.....	834
(2) Number containing hookworm ova	160
(3) Number containing Tricocephalus	10
(4) Number containing Hymenolepsis	7
(5) Number containing Taenia saginata	6
(6) Number containing Ascaris	15
(7) Number containing Strongyloides Oxyuris	4

5. Summary:

(1) Number of persons examined .....	..
(2) Number of persons treated by physicians.....	3,210
(3) Number of persons treated by staff.....	4,262
(4) Total number of persons treated.....	7,472

III. Educating the people in sanitation.

1. By public lectures:

(1) Number of public lectures delivered.....	138
(2) Estimated number of persons reached.....	13,308

2. Through the schools:

(1) Number of teachers in state	21,277
(2) Number of teachers reached by visit.....	98
(3) Number of teachers reached by letter	230
(4) Number of teachers reached by bulletins	230
(5) Number of teachers reached at institutes	57

3. By bulletins, leaflets and special literature:

(1) Total number of bulletins and leaflets distributed..	38,956
--	--------

4. Through the press:

(1) Number of papers in state	933
(2) Number of papers personally visited	27
(3) Number of letters to press.....	125
(4) Number of articles furnished for publication.....	139

IV. Notes on work of the year.

1. Every physician solicited has co-operated cheerfully in the work. In numerous places the doctors have devoted an entire day to bringing suspected carriers and sufferers to our dispensaries for examination and treatment. This active co-

operation of the physicians has been of incalculable value in making the work a success.

2. Every school teacher and school trustee in the counties where the work has been carried on has been reached, either by personal visit or by letter. The response has been immediate and effective. In places entire rural schools of 25 or more pupils have been examined and from 25% to 100% of the children found infected. All the teachers are anxious to learn about hookworm disease and its prevention so that they may instruct their pupils in this matter.

3. With but singularly few exceptions the county officials are anxious to have the State make investigation among their people. This interest is evidenced by the fact that in six months 15 counties have made appropriation for the county dispensary.

4. The President of the State Board of Health and the State Superintendent of Public Instruction have endorsed a bill to be presented to the State legislature providing that all children attending the rural schools must be examined for hookworm infection once a year by the State Board of Health or present a satisfactory certificate showing that the child has been examined and been found free from infection.

5. The State Text Book Board has recently adopted a text book on hygiene, "The Human Body and Its Enemies," to be used in all the schools of Texas. This book contains an illustrated chapter on hookworm disease, its symptoms, treatment and prevention.

6. In Jasper county the Women's Clubs have recently carried on "Clean-up Crusades" in many of the villages and smaller towns. This followed in the wake of the campaign carried on by the Commission. The county health officers of Jasper, Angelina, Montgomery and Hardin counties are urging medical inspection of schools and laying particular stress upon hookworm disease.

VIRGINIA.

I. State survey by counties.

1. Infection survey, based on an examination of at least 200 children between the ages of 6 and 18 years, taken at random from the country:

County.	Area in Sq. miles.	Population.	Number examined.	Number infected.	Perctg. of infection.
Bedford.....	729	39,356	251	57	22.7
Caroline.....	562	16,709	1,848	645	34.9
Essex.....	277	9,701	280	155	55.4
Franklin.....	690	25,953	883	378	42.8
Greensville.....	288	9,758	326	212	66.5
Henry.....	425	19,265	1,287	635	49.3
Middlesex.....	156	8,220	252	65	25.7
Northumberland..	235	9,846	219	31	14.1
Patrick.....	489	15,403	954	636	66.6

2. Sanitary survey, based on an inspection of privy conditions at at least 100 country homes:

County.	TYPE OF PRIVY.						Total.
	A	B	C	D	E	F	
Albemarle.....	3			28	160	18	209
Amelia.....					138	67	205
Amherst.....				4	90	107	201
Appomattox.....				2	98	107	207
Bedford.....					19	132	151
Buchanan.....				5	87	174	266
Caroline.....	1			27	117	58	203
Chesterfield.....	1			39	152	15	207
Charles City.....				10	115	89	214
Charlotte.....				4	106	93	203
Culpeper.....	6			40	140	19	205
Cumberland.....				1	93	110	204
Dickenson.....				15	43	146	204
Dinwiddie.....		1		12	145	50	208
Essex.....				6	101	95	202
Fairfax.....	3	2		51	139	14	209
Fauquier.....	3			43	156	14	216
Fluvanna.....		1		3	105	96	205
Gloucester.....	5				113	82	200
Goochland.....				3	78	127	208
Greene.....	1			5	166	56	228
Greensville.....					112	96	208
Hanover.....		6		3	147	58	214
Isle of Wight.....	2			5	126	76	209
James City.....	1			26	106	71	204
King and Queen.....					164	75	239

Sanitary Survey (Continued.)

County.	A	B	C	D	E	F	Total.
Louisa.....	1			8	155	40	204
Loudon.....	4			49	150	8	211
Madison.....	1			10	172	31	214
Nansemond.....				10	130	61	201
Nelson.....				5	100	97	202
New Kent.....				6	122	78	206
Norfolk.....	1			38	145	27	211
Nottoway.....	1			3	127	70	201
Orange.....	5			7	151	28	191
Prince Edward.....				1	115	90	206
Prince George.....				6	149	46	201
Prince William.....				31	144	37	212
Princess Anne.....				29	148	42	219
Powhatan.....	2			4	101	94	201
Rappahannock.....	3			15	172	32	222
Spotsylvania.....	1			14	130	67	212
Surry.....				6	125	78	209
Sussex.....				5	126	81	212
Stafford.....					98	102	200
Warwick.....				22	123	66	211
Wise.....				8	124	95	227
York.....	2	I		16	127	67	213

II. Getting the people treated.

1. Enlisting the physicians:

(1) Number of physicians in state	2,357
(2) Number of physicians personally interviewed	365
(3) Number of lectures to physicians.....	18
(4) Number of physicians thus reached.....	560
(5) Number of circular letters sent to physicians.....	6,300
(6) Number of bulletins sent to physicians.....	8,900
(7) Number of physicians now treating the disease....	194
(8) Number of persons treated by physicians.....	1,627

2. Getting the people to seek examination and treatment:

(1) Number of schools inspected	340
(2) Number of persons examined:	
Clinically	15,227
Microscopically	25,995
(3) Number of persons treated by field force other than dispensaries	3,317
(4) Number of persons treated by dispensaries.....	5,656
(5) Total number of persons treated on record.....	10,600

3. Work of county dispensaries:

Doctor and County.	Amt. of Appro.	Amount used.	Duration of campaign.	Examinations. Mic.	Pos.
(Dr. Brumfield.)					
Bedford.....	\$100.00	\$100.00	5 weeks	1,363	361
Henry.....	100.00	100.00	4 weeks	2,563	912

(Dr. Fisher.)					
King and Queen.....			4 weeks	276	147
Essex.....			4 weeks	669	307
Gloucester..... 100.00			4 weeks	169	24
(Dr. Miller.)					
Franklin..... 100.00	100.00		5 weeks	4,659	1,195
Patrick..... 100.00	100.00		5 weeks	3,776	1,666
Caroline..... 100.00	100.00		5 weeks	4,854	1,044
Totals.....	\$600.00	\$500.00	36 weeks	18,329	5 656

Appropriations made but work not yet started:

Appomattox	\$100
Roanoke	100
Tazewell	100
Lee	100
Wise	100
Dickenson	100

Total.....\$600

County and Doctor.	No. of persons and times treated.			No. people treated.	Total No. treat-ments.
	1	2	3		
(Dr. Brumfield.)					
Bedford.....	361	326	20	361	707
Henry.....	912	874	752	912	2,538
(Dr. Fisher.)					
King and Queen.....	147	140	19	4	310
Essex	307	62		307	369
Gloucester.....	24	2		24	26
(Dr. Miller.)					
Franklin	1,195	1,192	675	18	3,080
Patrick.....	1,666	1,666	1,662		4,994
Caroline	1,044	1,044	1,044		3,132
Totals.....	5,656	5,306	4,172	22	15,156

4. Report of Laboratory:

(1) Total number of specimens examined.....	5,569
(2) Number showing hookworm infection.....	1,569
(3) Number of specimens negative	3,290
(4) Number of specimens showing roundworm infection	757
(5) Number of specimens showing other parasites.....	183

5. Summary:

(1) Number of persons examined	41,223
(2) Number of persons treated by physicians.....	1,627
(3) Number of persons treated by staff.....	8,973
(4) Total number of persons treated.....	10,600

III. Educating the people in sanitation.**1. By public lectures:**

(1) Number of public lectures delivered.....	410
(2) Estimated number of persons reached.....	46,850

2. Through the schools:

(1) Number of teachers in state	9,000
(2) Number of teachers reached by visit	410
(3) Number of teachers reached by letter	950
(4) Number of teachers reached by bulletins	9,000
(5) Number of teachers reached at institutes	2,150

3. By bulletins, leaflets and special literature:

(1) Total number of bulletins and leaflets distributed.....	165,000
---	---------

4. Through the public press:

(1) Number of papers in state	211
(2) Number of papers personally visited	50
(3) Number of letters to press.....	25
(4) Number of articles furnished for publication.....	16
(5) Special articles	200

IV. Notes on work of the year.

1. The State legislature enacted a law providing for the registration of births and deaths in Virginia.

2. The Virginia State Board of Health on January 10, 1912, promulgated the following regulation:

"Whereas, many public schools in Virginia are not provided with proper sanitary conveniences; and, whereas, such conditions are dangerous to the health of the pupils and to the public health,

"Therefore, be it ordered by the State Board of Health that from and after September 1st, 1912, no building shall be used for public school purposes in Virginia unless same shall be provided with two sanitary privies, built and maintained in accordance with the regulations of this Board.

"Be it further ordered that all officers and agents of this Board are ordered to proceed with the enforcement of this regulation in any case of violation of its provisions observed after September 1st, 1912."

3. Every city in Virginia at the present time is making more or less effort to render sanitary every privy within their limits. Roanoke, Richmond, Lynchburg and Norfolk have practically achieved this end, and the work is now going forward in the rest of the cities. In the towns much has already been accomplished and progress is continuous and satisfactory.

4. The State Board of Education has approved and made part of the school law the regulations for the sanitation of schools promulgated by the State Board of Health. These have been transmitted officially to all county school boards. The progress already made is exceedingly encouraging, but exact details cannot be given, as the reports of the State Board of Education have not yet been compiled.

5. Number on record of sanitary privies built in rural districts 310. Several thousands have been built or rendered sanitary in cities and towns.

6. There has been a marked increase in the activity and efficiency of the county health officers throughout the State. In a number of counties salaries have been increased and sanitary work much extended.

7. Through the co-operation of the State supervisor of rural colored schools, February 12 was celebrated in the colored schools of 18 counties as Health Day. The Tuberculosis Catechism of the State Board of Health was taught in all the colored schools in these 18 counties to approximately 30,000 colored people. The supervisors of these 18 counties have agreed to secure two sanitary privies at each colored school. This work has made great progress during the year. Co-operation of the Negro Organization Society promises much for the improvement of sanitary conditions among the negroes.

A definite scheme of work has been mapped out and is now being followed.

8. Strong effort has been made to secure the building of sanitary privies at railroad stations in the State. The Richmond, Fredericksburg and Potomac Railroad has already completed sanitary privies at each station. The Atlantic Coast Line Railroad has built an experimental LRS privy at Jarratt, Virginia, and has authorized the installation of similar privies at all stations in Virginia as soon as the value of this type is proved. The Southern Railway has submitted plans for a sanitary privy to be erected at all stations along its lines as soon as approved.

CHAPTER III.

HALF-TONE ILLUSTRATIONS.

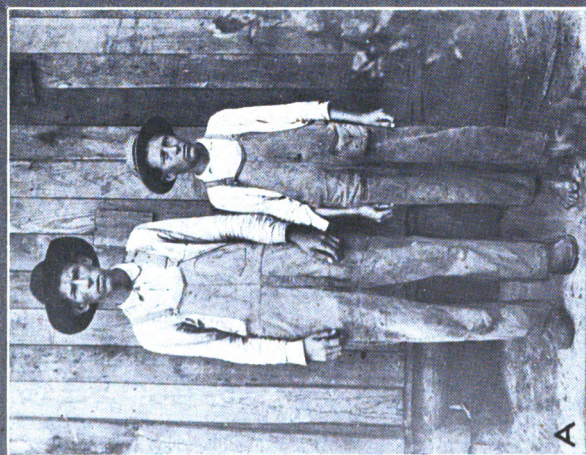


Fig. 1—Showing dwarfing effects of hookworm disease. a. Bryant brothers, Forest Co. Miss. Smaller infected; said to be 21 years old; weight 66 pounds. Larger not infected; 17 years old; weight 126 pounds. b. Two boys, Johnson Co., Tenn., each 15 years of age; the smaller infected, the larger not infected c. Eugene Jenkins (left); age 21; weight 65. James Newman (right); age 10; weight 63.

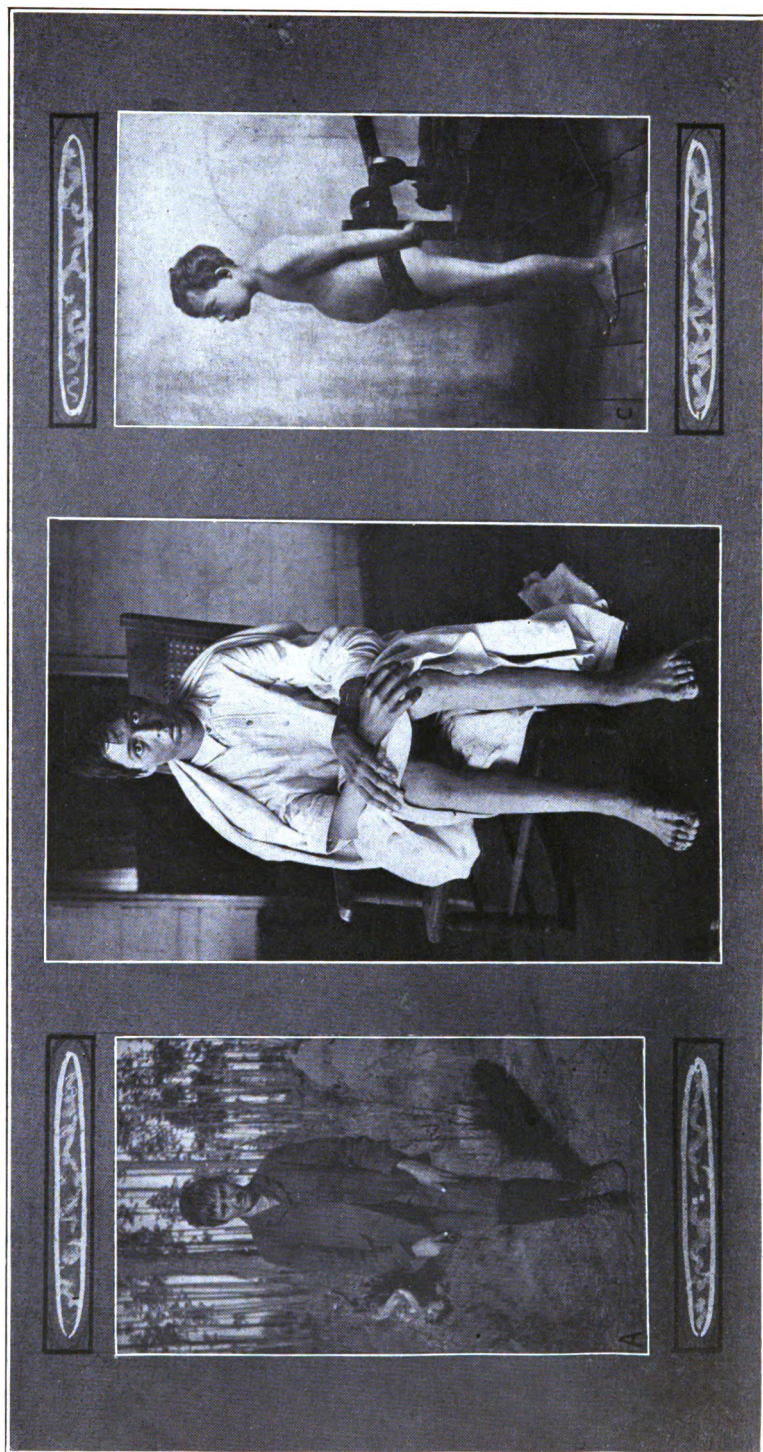


Fig. 2—Severe infections. a. Hardy Baker, Tift county, Ga. age 17 years, hemoglobin 10%; weight 86 pounds; treated December 10, 1911; first treatment expelled 1,000 worms. b. Father, mother and 7 children, all infected. c. Pot belly, a frequent symptom in severe cases. Hospital case, dismissed after two treatments.

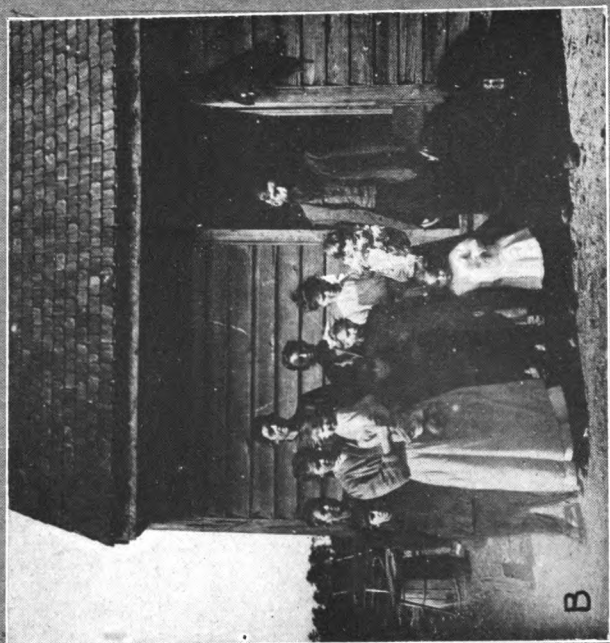
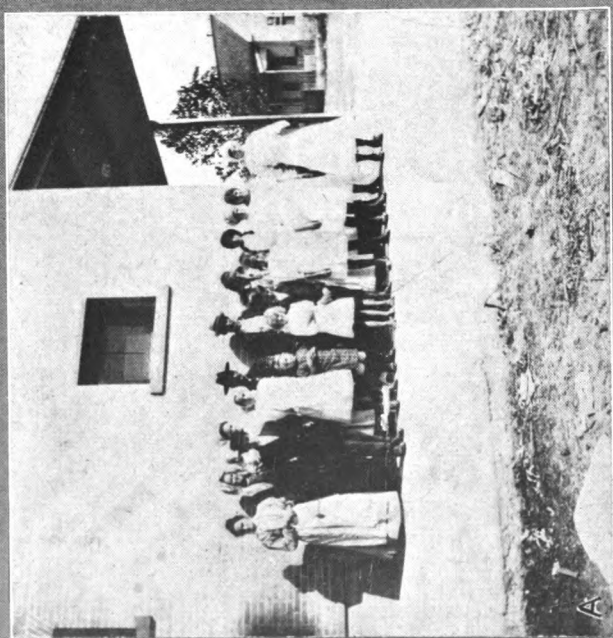


Fig. 3—Showing whole families infected. a. Two families, Hardin Co., Texas; all infected. b. Family, Mecklenburg Co., Virginia, all infected.

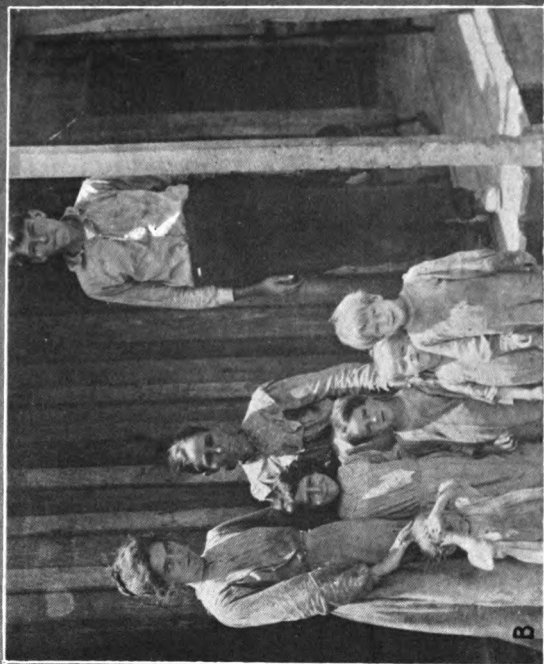
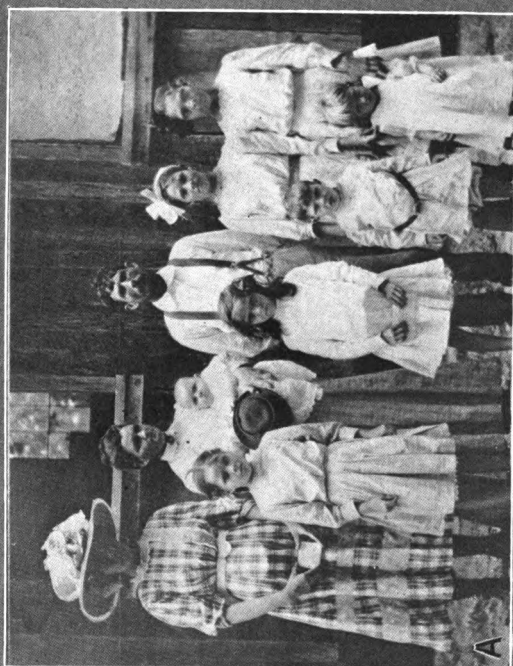


Fig. 4—Showing whole families infected. a. Short family, Mississippi, all infected. b. Family group, Covington Co., Miss., all infected. Infection heavy. Mother been nursing sick children for seven years; refused to have them treated for hookworm disease.

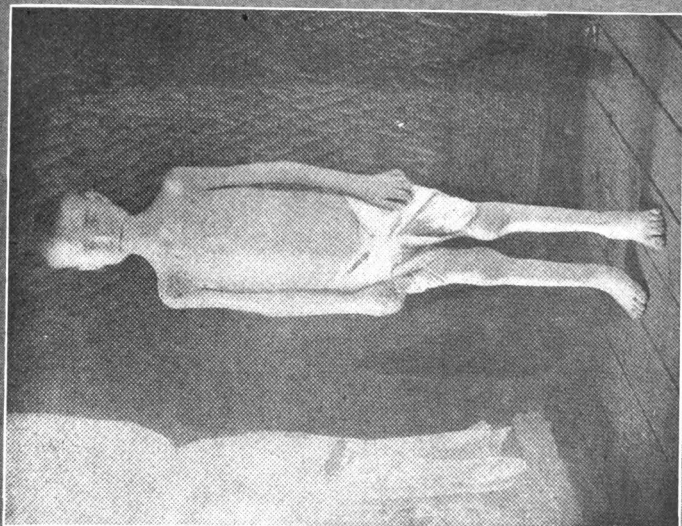


Severe case hookworm infection, Kentucky mountains.

Fig. 5.



Same boy 14 months after first treatment.



Brother of boy in Fig. 5.

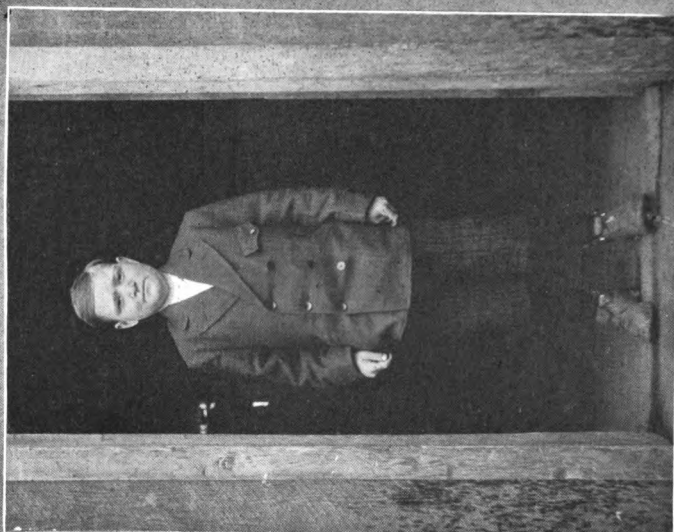


Fig. 5a. Same boy 14 months after first treatment.

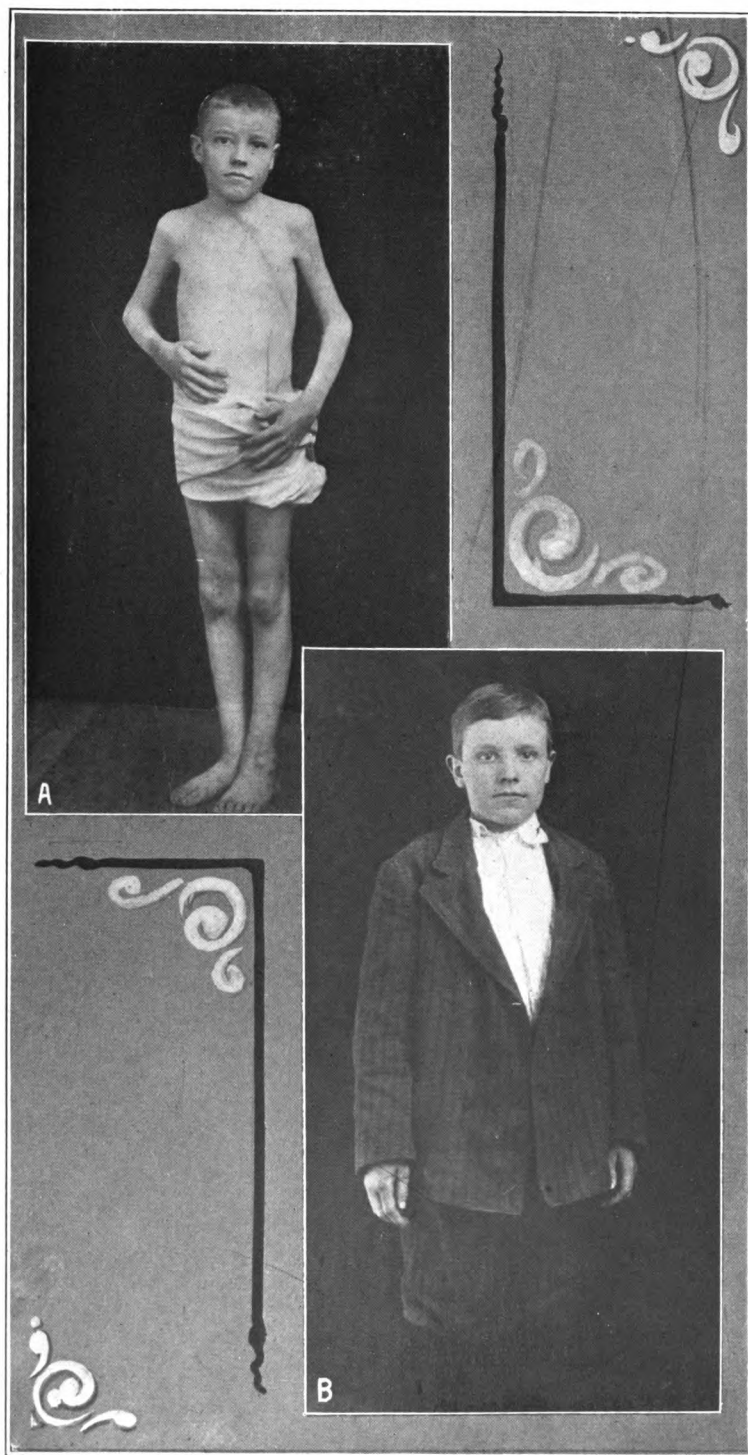


Fig. 6—Showing results of treatment. a. Bryan Shell, Arkansas; age 13, very anaemic; sick since childhood; hemoglobin less than 15%. b. Bryan Shell nine weeks after receiving first treatment. Had 9 treatments one week apart. Hemoglobin 95%.



Fig. 7—Results of treatment. a. Tom Riels, Tylertown, Miss. Heavy infection; ulcer on leg. b. Joe McFarland, Corbin, Ky.; says he had always been weak and pale; had had ulcer on right leg for 7 years; had had surgical operation without beneficial results; visited dispensary at Corbin July 1912, was found heavily infected; was sent to U. S. Marine Hospital at Wilmington, N. C., where he was under treatment for 25 days; number of hookworms expelled 2,464; weight before treatment about 115 pounds; on December 28, 1912, he reports ulcer healed; weight 155 pounds; in perfect health and feels fine; is mining coal; can do as much work as any man; never feels tired; photograph made last of December, 1912.

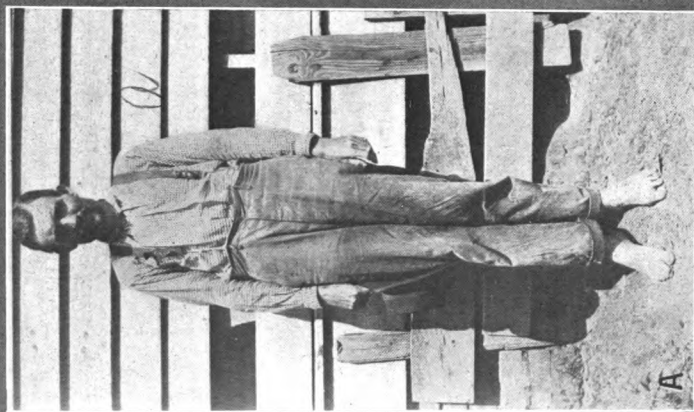


Fig 8—Results of treatment. a. T. W. Temple, Mississippi. Age 28; heavily infected; unable to work for 3 years; gained 10 pounds in 2 weeks after 1 treatment b. Eddie Bouncer, Collins, Miss.; infected. Stopped school. Now well and making progress.

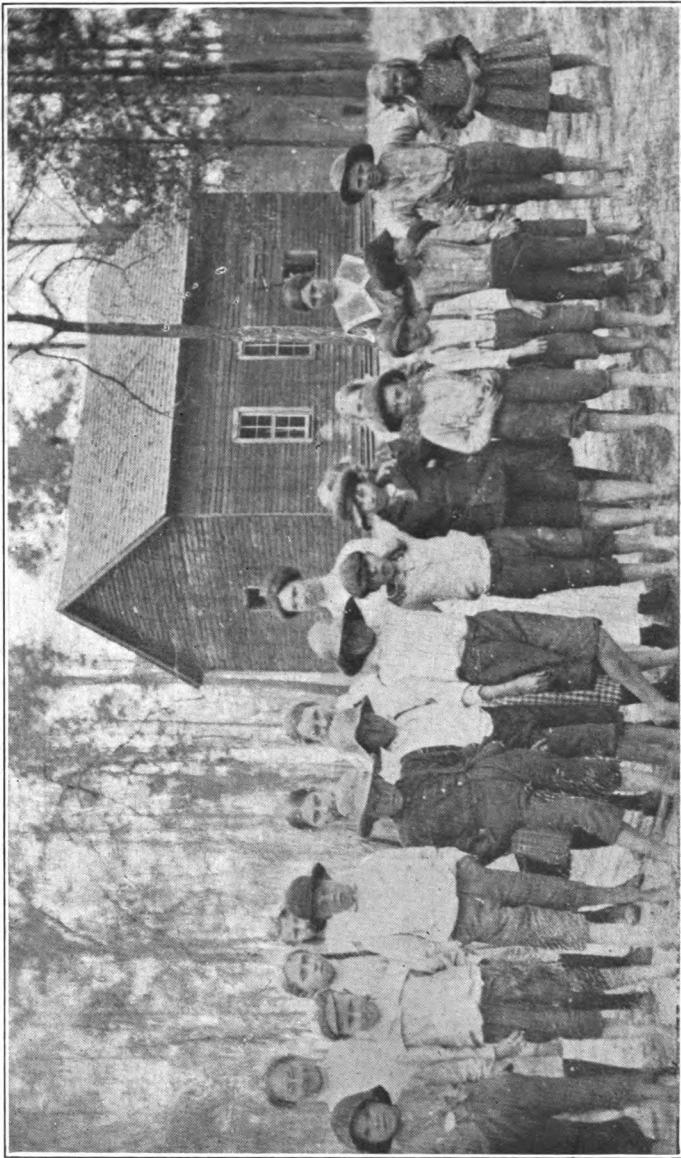
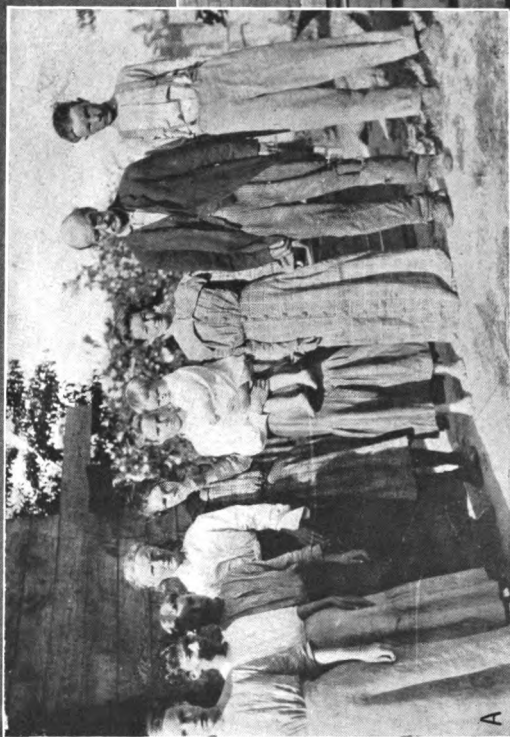


Fig. 9—Public school, Marion Co., Miss. 100% infection. Had not been treated when photograph was made. Compare with Fig. 10.



Fig. 10—Public school, Marlon Co., Miss., located near school in Fig. 9. 100% infection; nearly all had been treated when photograph was made. Compare with Fig. 9.



A



B

Fig. 11—Results of treatment. a. Family group, Collins, Miss.; 10 members in family; for two years only the mother had been able to work; she had sold the family horse and cow to buy medicine that did no good; had supported the family by scrubbing and washing and receiving donations from neighbors; photograph made soon after treatment, May, 1912. b. Photograph of seven members of same family made November 18, 1912.

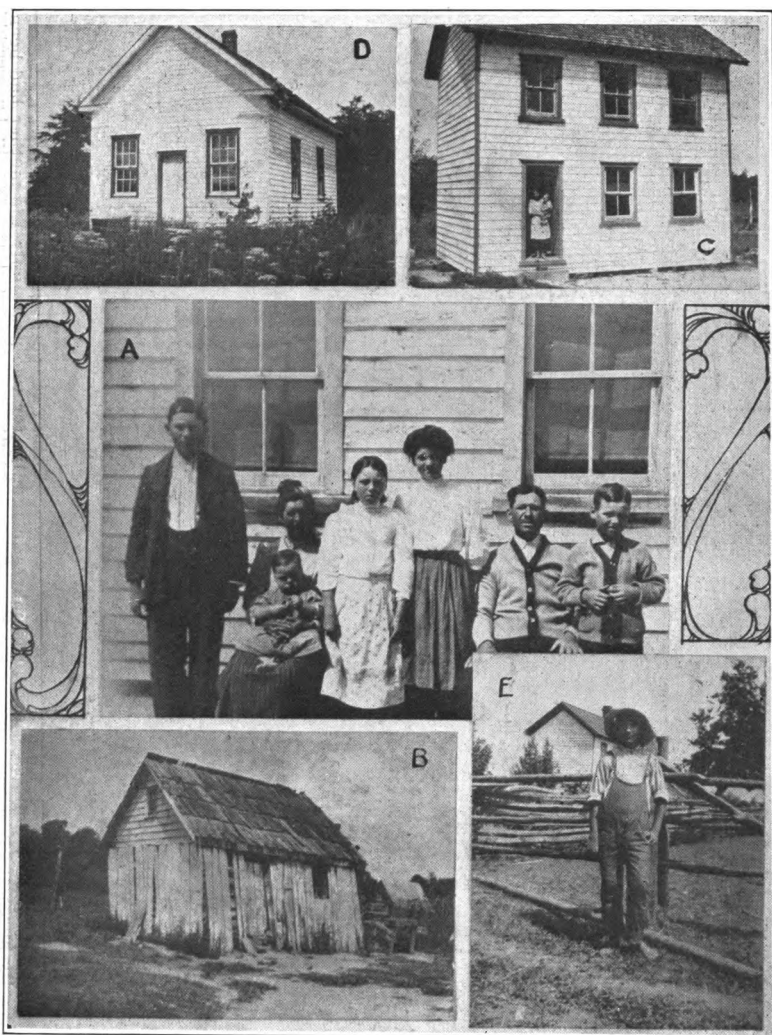


Fig. 12—Results of treatment. a. Prescott family, Richmond county, Va.; whole family found heavily infected in 1910. The mother had never known a well day; father was doing about half work, the oldest boy almost none. No one of these children, no member of their parents' family, or their grandparents' family, or their great-grandparents' family on either side had ever gone to school. Photograph made nearly two years after treatment. b. House in which the children were born and in which the family had lived up to time of treatment. c. House which the family built and moved into about 14 months after treatment. d. School which children are now attending. e. Boy at fence has made a good crop. He and his father are now using their muscle and energy to bring the family into a prosperity never before known.

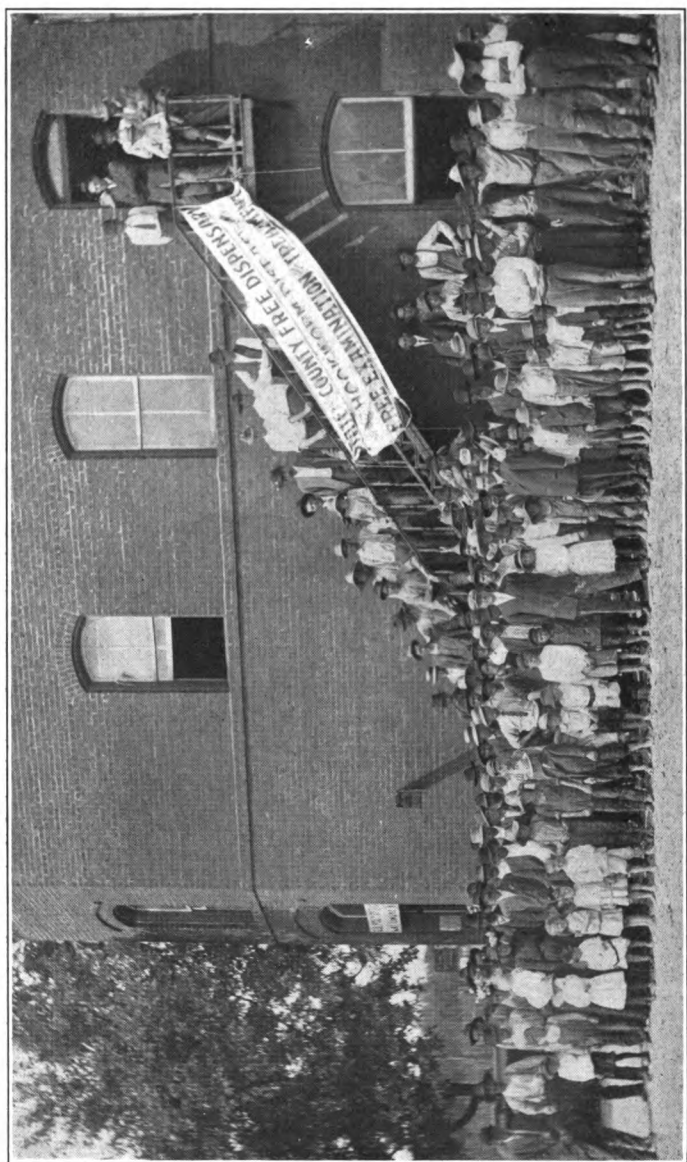


Fig. 13—Dispensary group at Lattimore, Cleveland Co., N. C. The people have come in to be examined and treated. Number of persons treated at dispensaries in this county, 1,770.

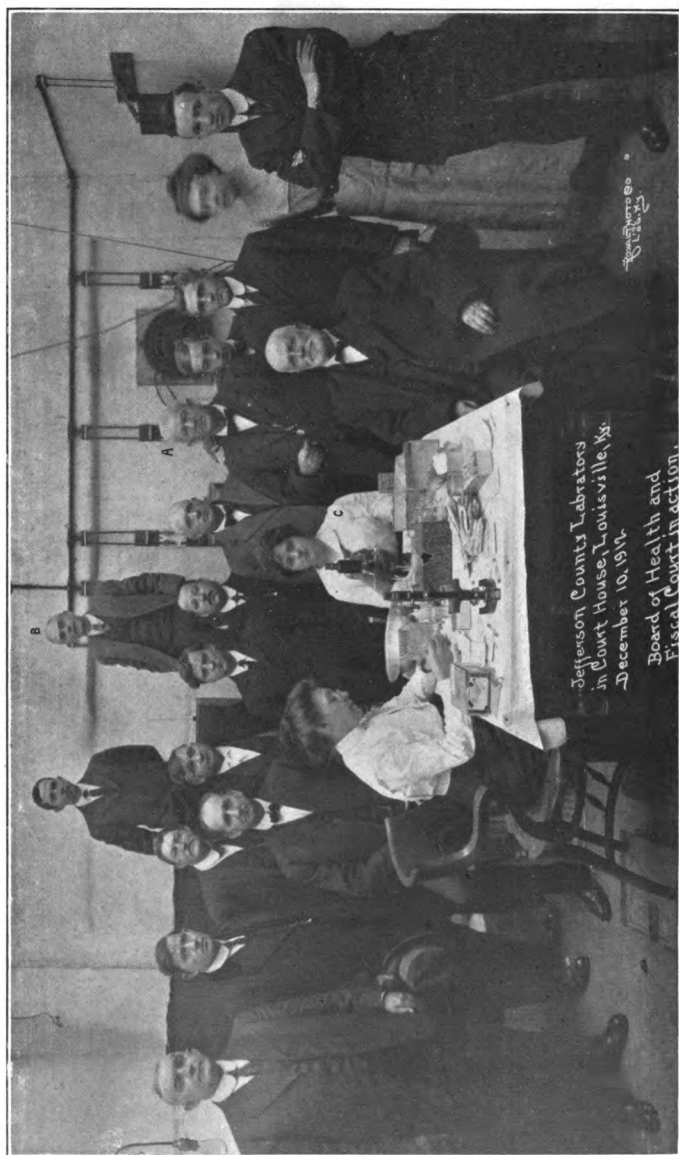


Fig. 14—Dispensary group, Jefferson Co., Ky. a. Dr. Richmond, physician in charge; b. Dr. Smock, county health officer; c. Young woman microscopist. Photograph illustrates co-operation of physicians, teachers, magistrates, school board, women's clubs and leading citizens. 700 specimens result of day's work. More than 2,000 heard lectures by Dr. Richmond and Dr. Smock.

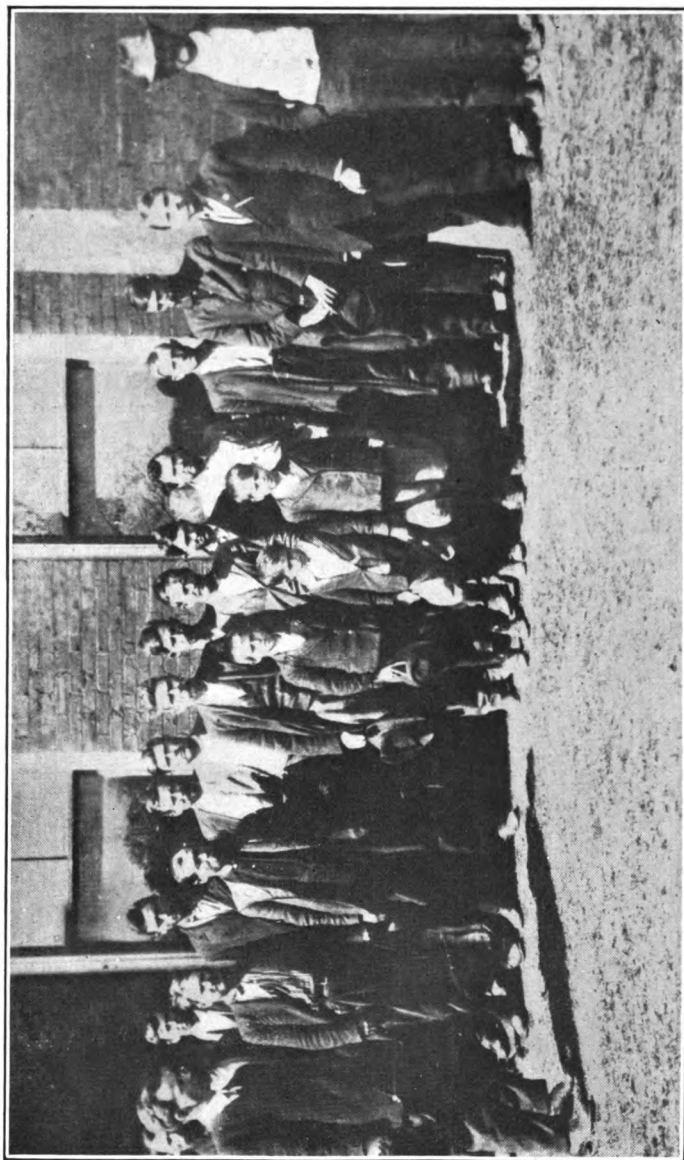


Fig. 15—Dispensary group, Nashville, Berrien County, Ga. 819 persons treated at dispensaries in this county.



Fig. 16—Dispensary group at Thornton, Leake county, Mississippi. Over 300 persons attended on this day. Infection about 80% for children from 6 to 18 years of age. Some of these people drove in 12 miles. 1,786 persons treated in county in 9 weeks.

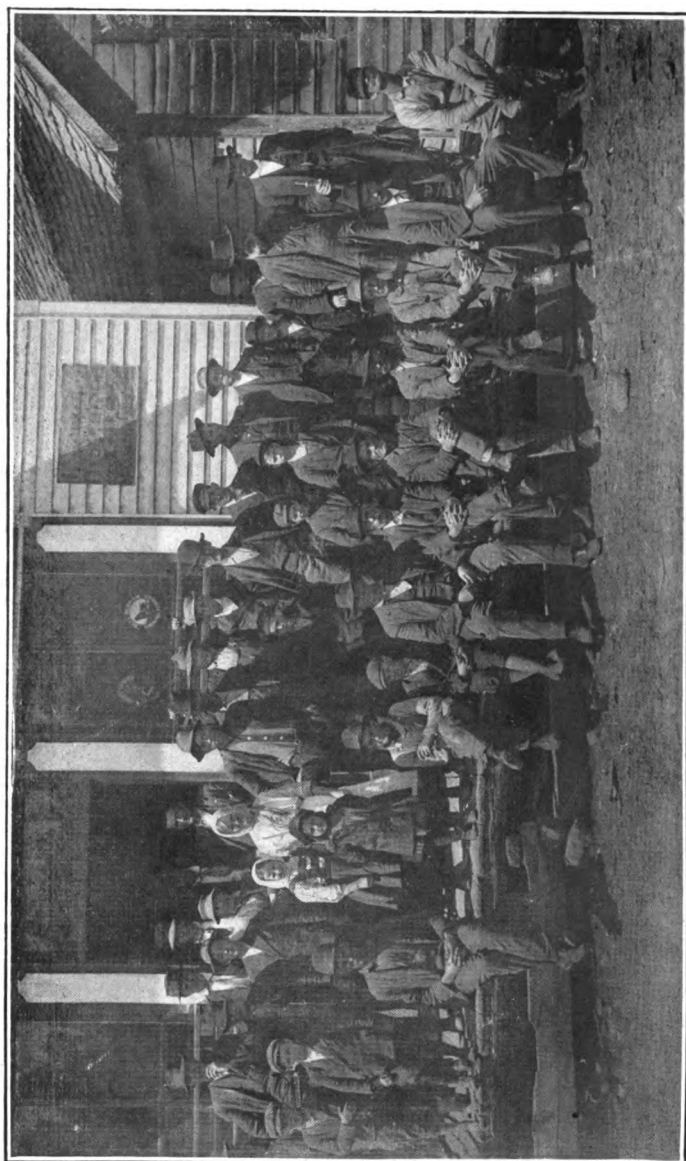


Fig. 17.—A typical mountain dispensary group, Carter Co., Tennessee. Second day of dispensary at that point.

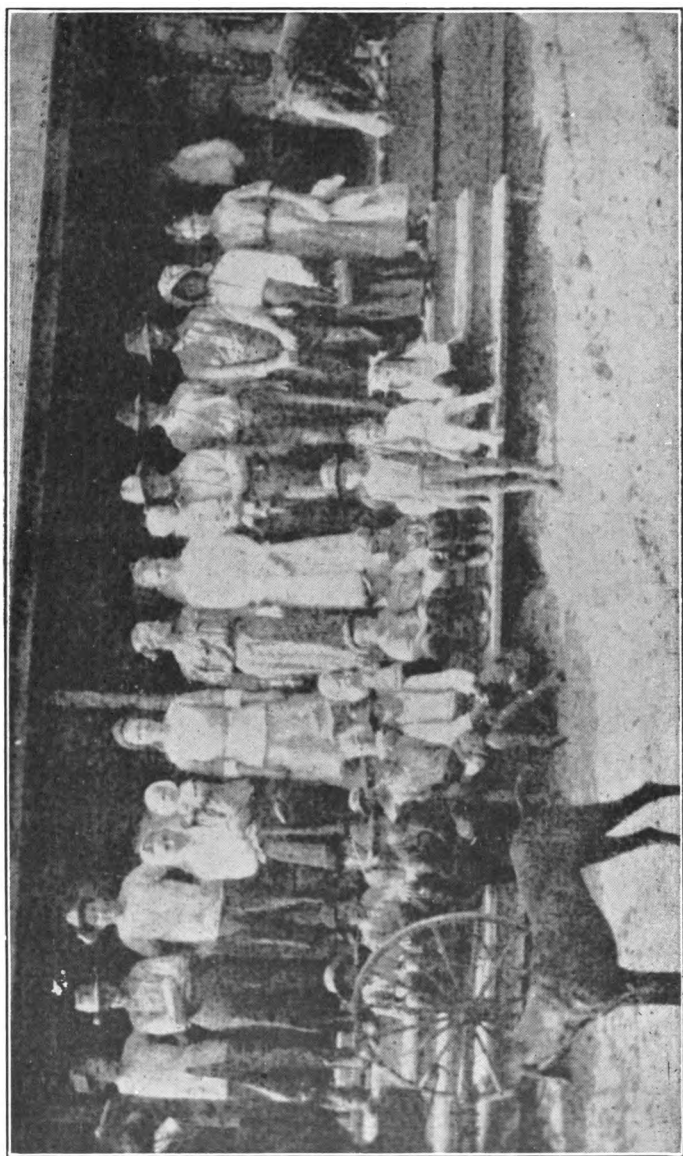


Fig. 18—Dispensary group, Kountze, Hardin Co., Texas. 1,512 persons treated in county in 5 weeks.

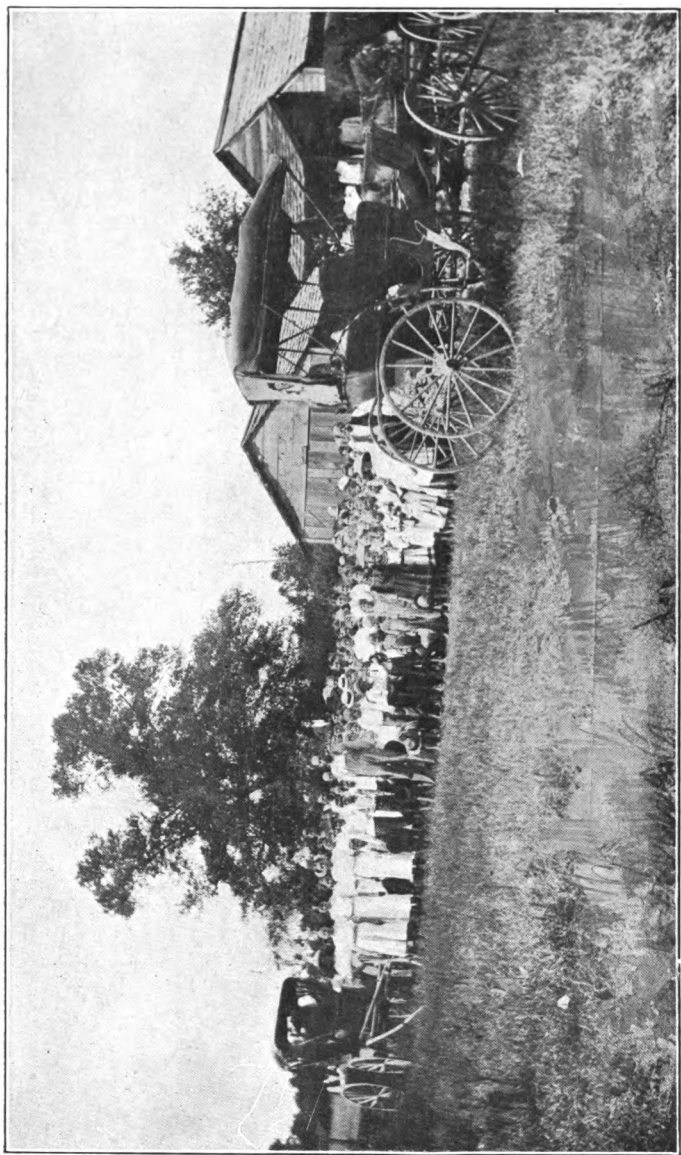


Fig. 19.—Dispensary group, Grier, Miss. Treated 217 day picture was made.

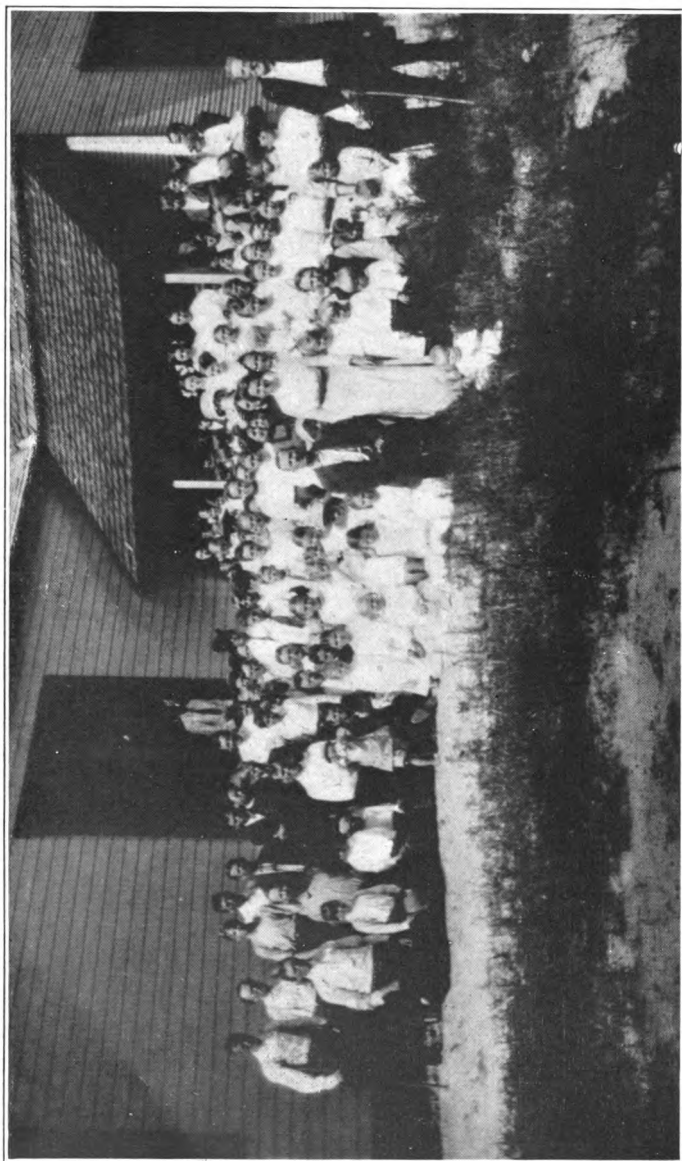


Fig. 20—Dispensary group at Simpson, Vernon parish, La. 2,384 persons treated in parish in 6 weeks.

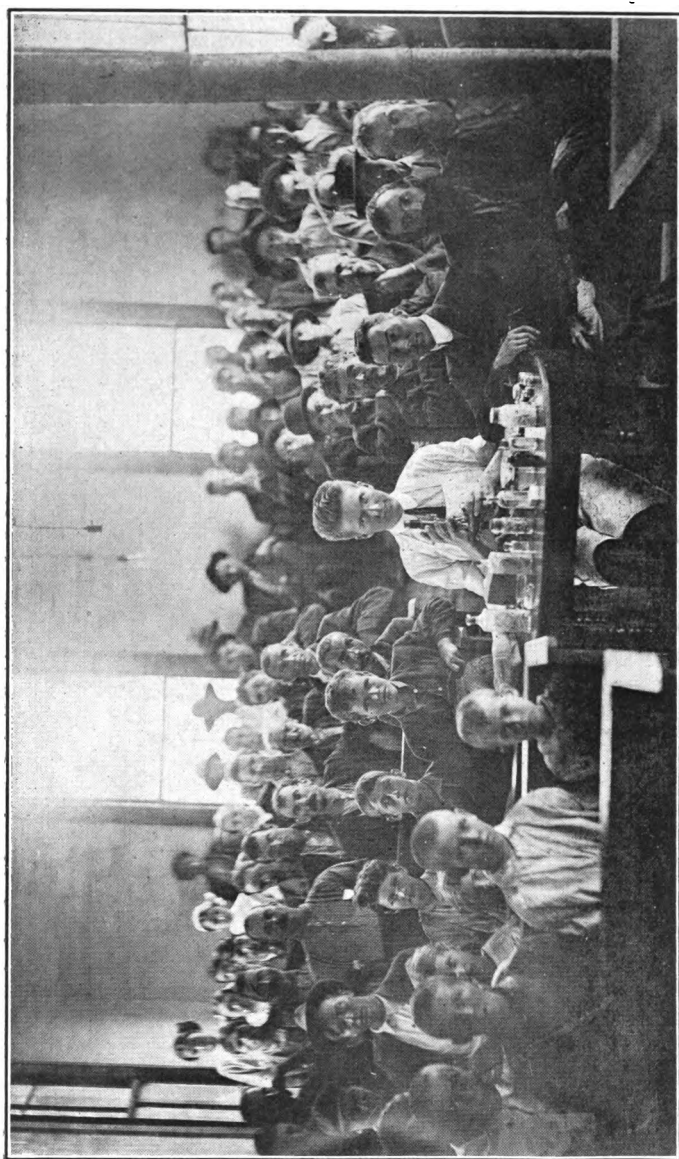


Fig. 21—Dispensary Lawndale, Cleveland Co., N. C. Crowd awaiting the results of the microscopic examination. 1,770 persons treated in county in 6 weeks.

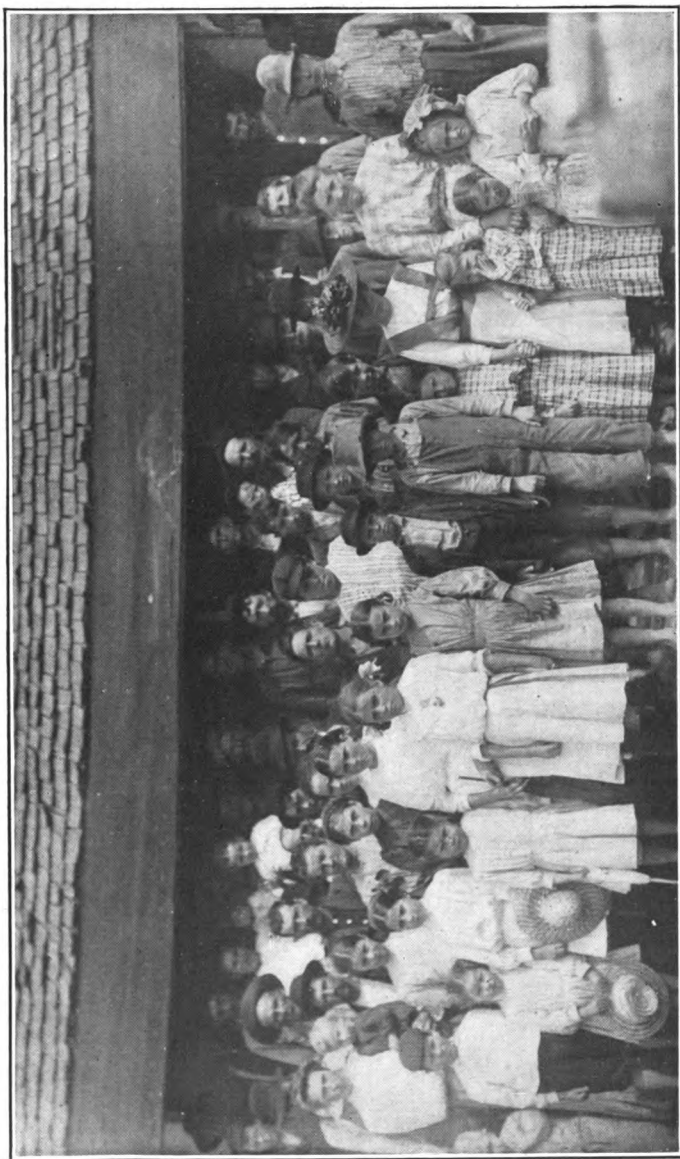


Fig. 22—Crowd at opening of dispensary at Colesville, Carter Co., Tenn.

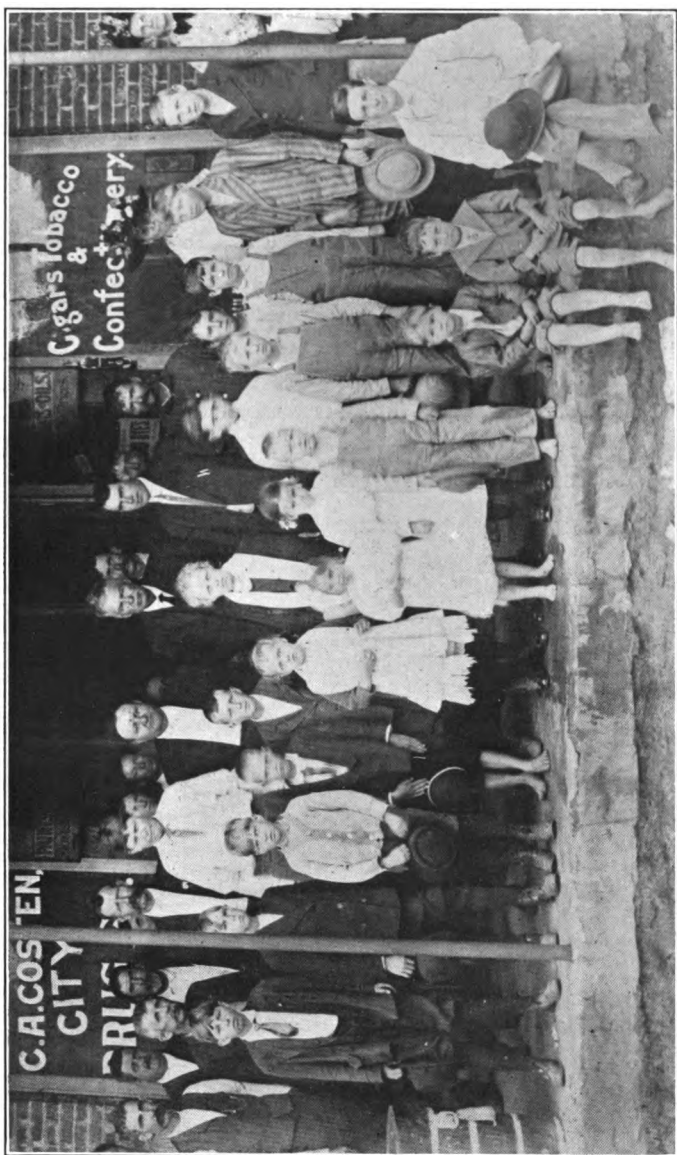


Fig. 23—Group of 31 patients treated in one hour at one of the dispensaries in Covington county, Alabama. Total of 188 cases treated for the day. The drug store in background constituted the dispensary headquarters.

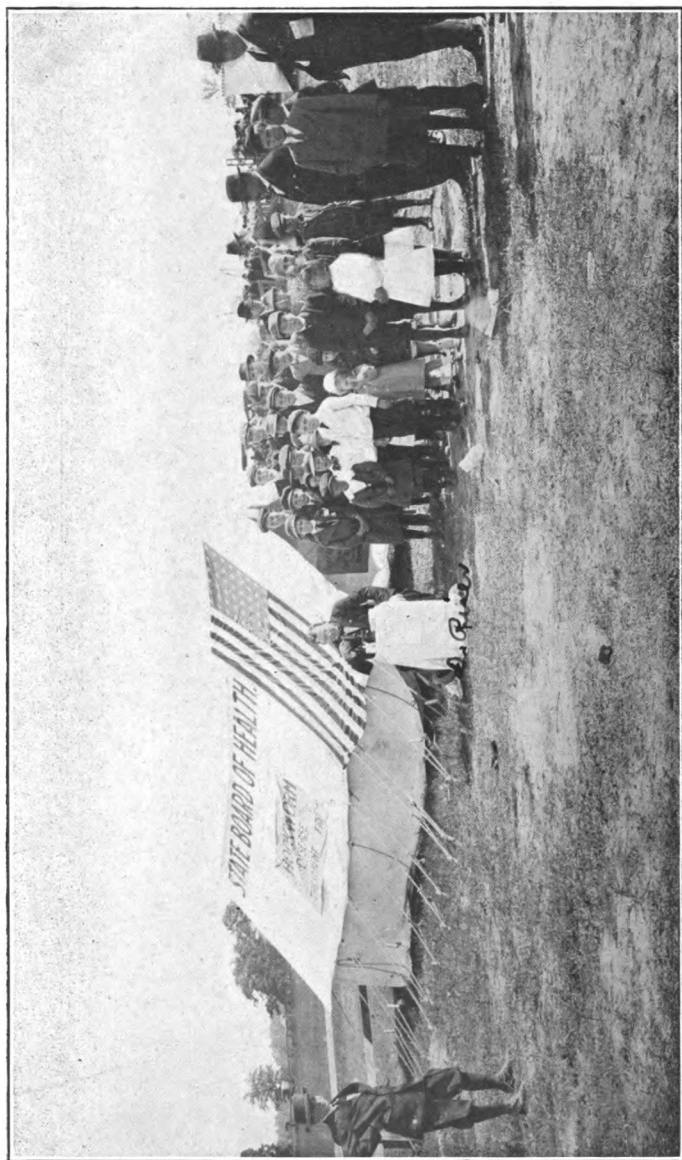


Fig. 24—Tri-county Fair, Batesburg, S. C. Tent loaned by a citizen of Batesburg. 141 persons treated one day.

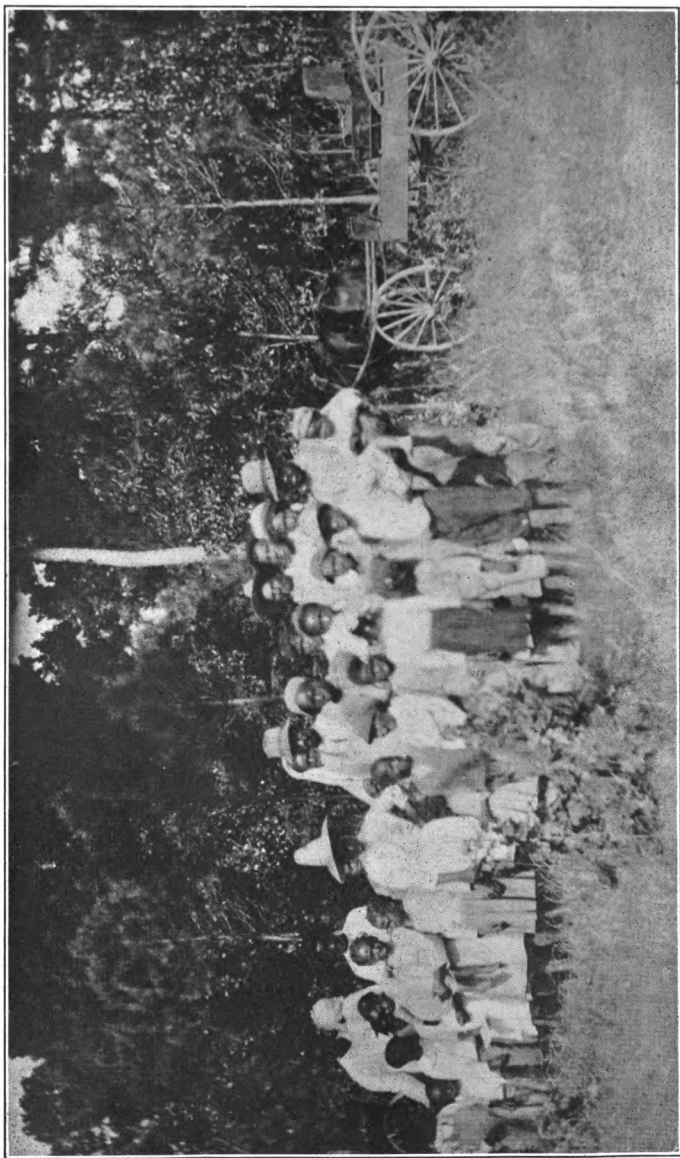


Fig. 25—Negro roadside dispensary, Leake Co., Miss. All but three in group infected.

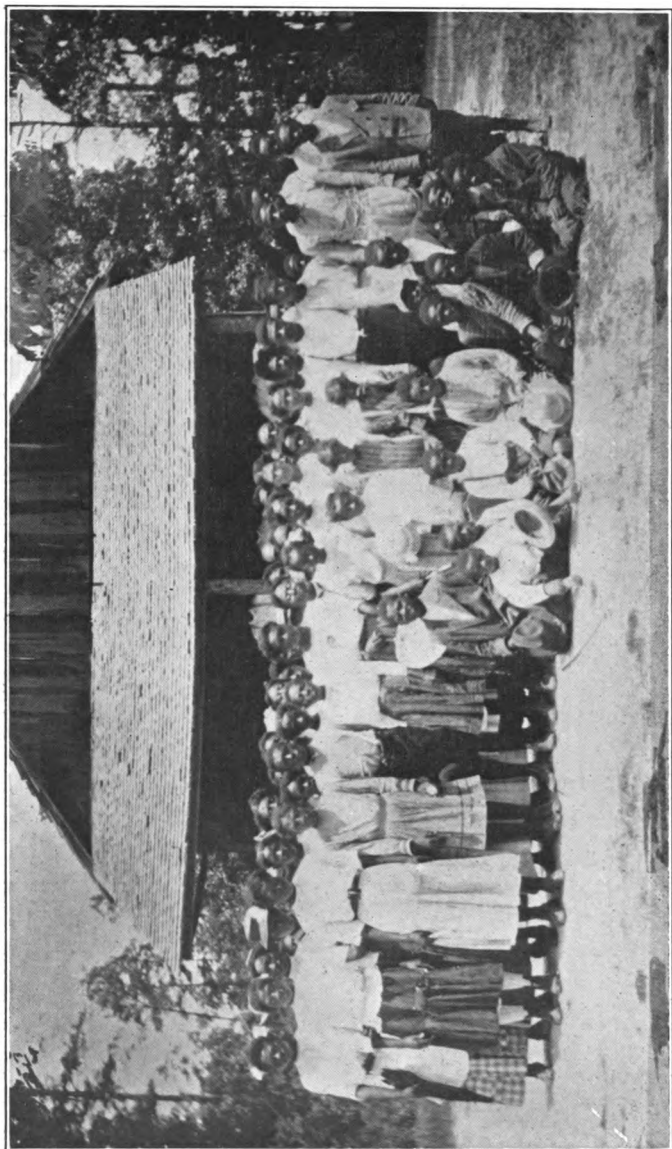


Fig. 26—Negro dispensary group, Ohio, Miss. Treated 247 day picture was made. 3,220 persons treated in county.

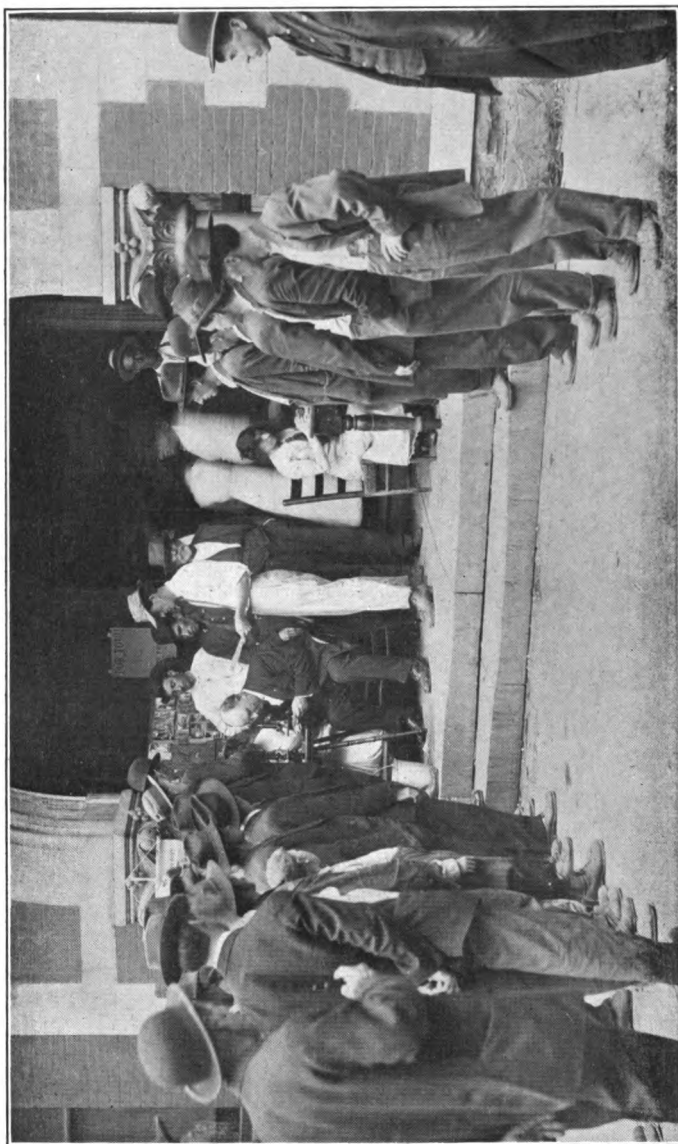


Fig. 27—Dispensary at Pineville, Ky. Examined 160 persons here on this day. Judge of Circuit Court suspended proceedings for an hour for lecture and exhibit in court room. 2,992 persons were treated in this county in 5 weeks.

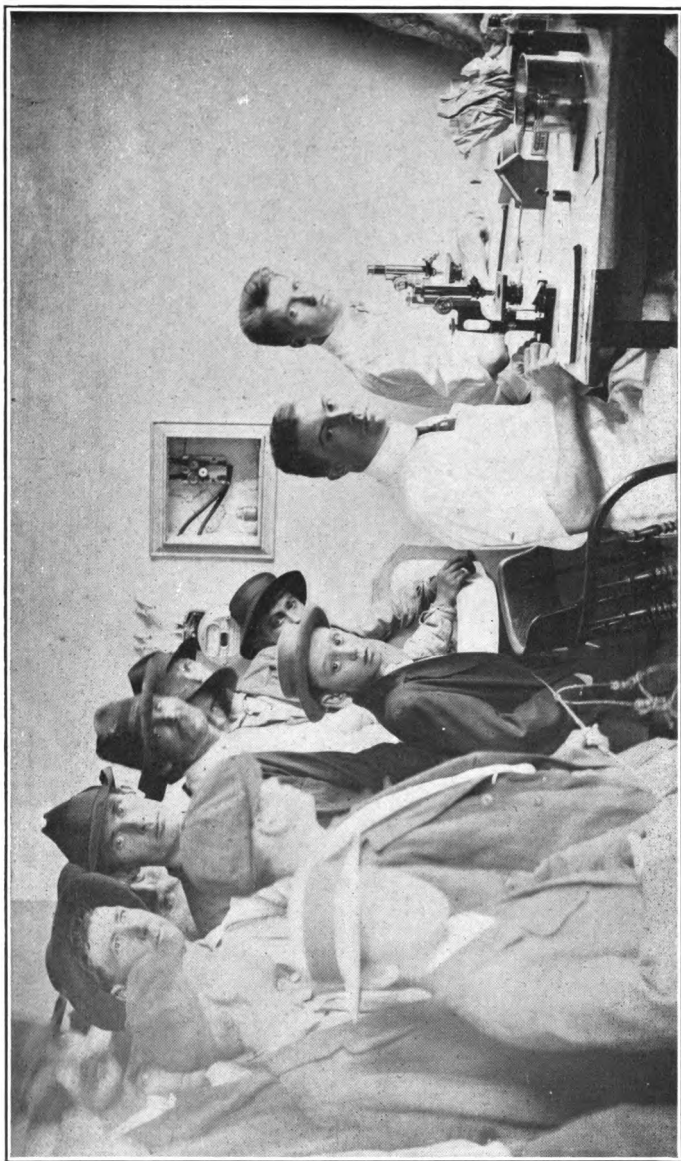


Fig. 28.—The battle of King's Mountain being fought anew. Free county dispensary, King's Mountain, N. C. 200 to 400 people examined here each Tuesday for 6 weeks.



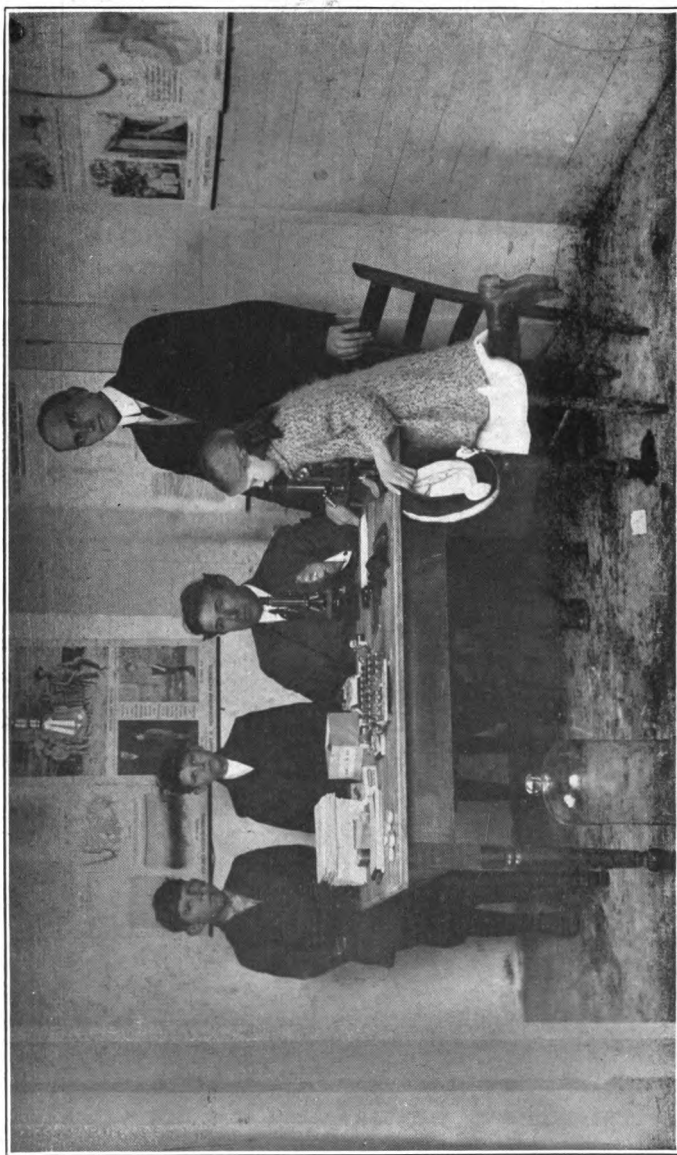
Fig. 29—Illustrating co-operation of local physicians. Dispensary at Cotton Valley, Webster parish, La. Three local physicians at table with microscopes.



Fig. 30—Dispensary group, Breathitt county, Ky. Dr. Shirley and two young women microscopists made the dispensary circuit of this county on horseback over the mountain roads. They were accompanied to each dispensary by the county judge or the county attorney and one or more local physicians. Within five weeks 1,298 persons were treated. The large man in the center of second row stayed by the table for two days listening for the names of his neighbors whose specimens he brought in. These specimens had been collected by one woman who had been cured.



Fig. 31—Group of physicians, Lauderdale Co., Miss. Co-operated heartily in the campaign for the eradication of hookworm disease and for the improvement of sanitary conditions in the county.



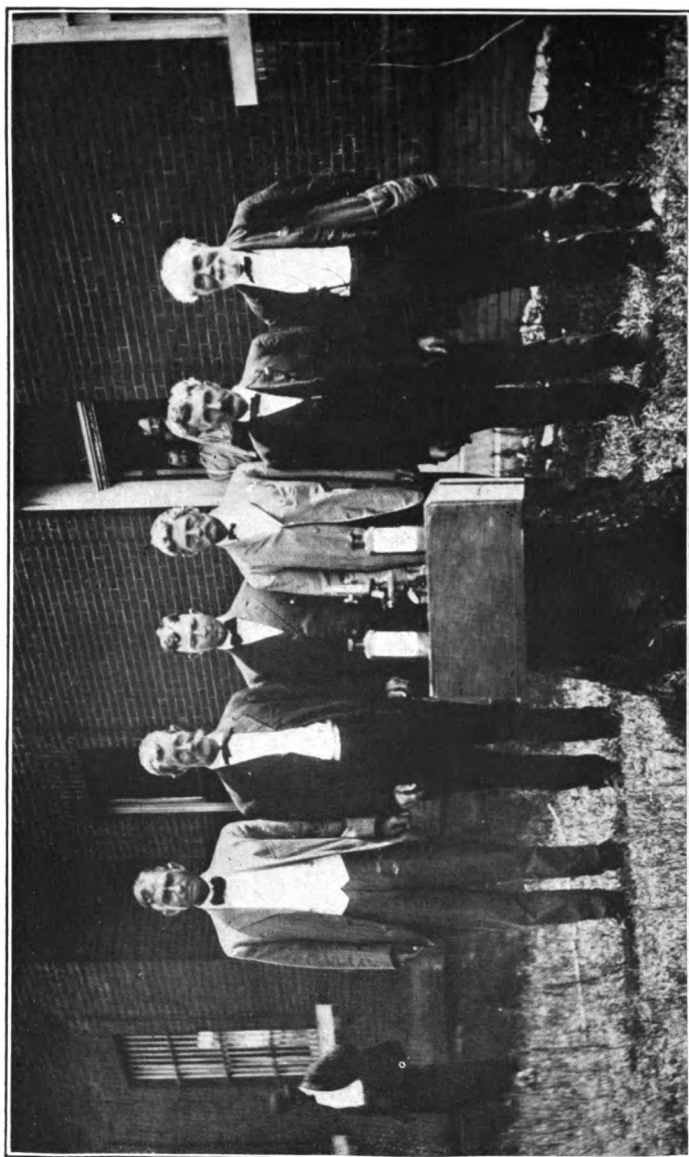
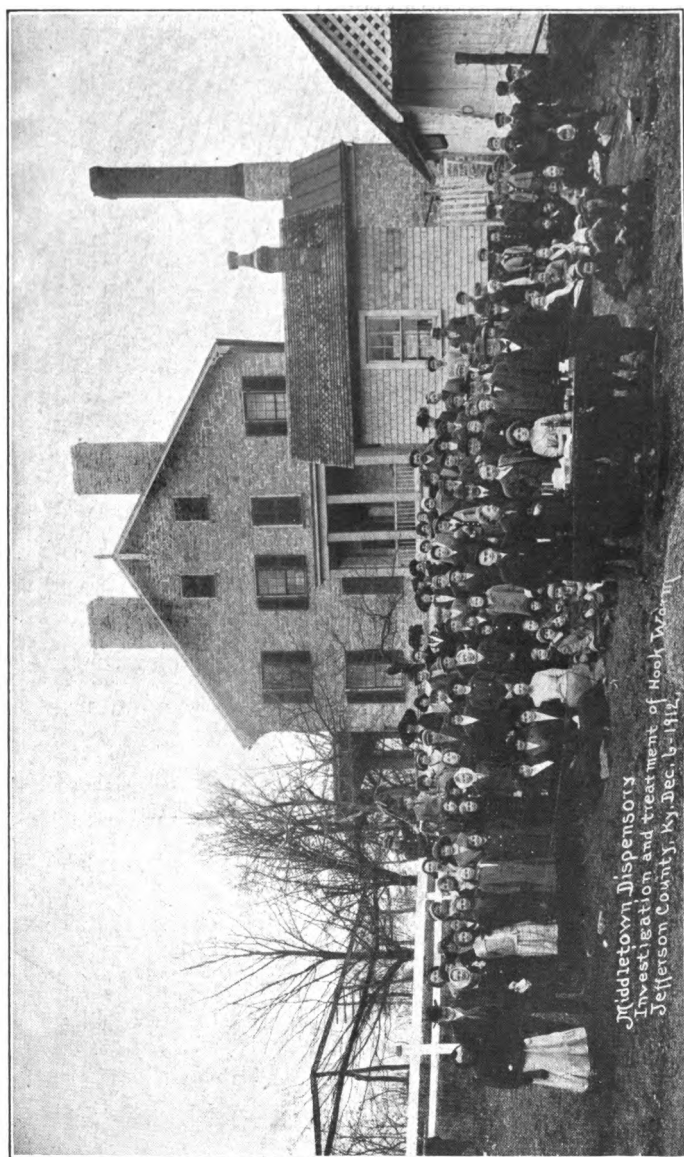


Fig. 33—Board of Supervisors, Amite Co., Miss. Justly proud of its record in making appropriation for the county dispensary, stood for a photograph. 3,220 persons were treated in this county in four weeks.



Fig. 34—Roadside meeting of the county commissioners, Yadkin county, N. C., assembled in this informal way to make appropriation for the county dispensaries. 2,538 persons treated at the dispensaries in this county.



Middletown Dispensary
Investigation and treatment of Hook Worm
Jefferson County, Ky. Dec. 6-1912.

Fig. 35.—Making a demonstration before the county judge, members of the fiscal court, the county school superintendent and the school board of Jefferson Co., Ky. As a result of this demonstration the fiscal court appropriated \$600 and guaranteed to finance the work until intestinal parasites have been eradicated in that county.

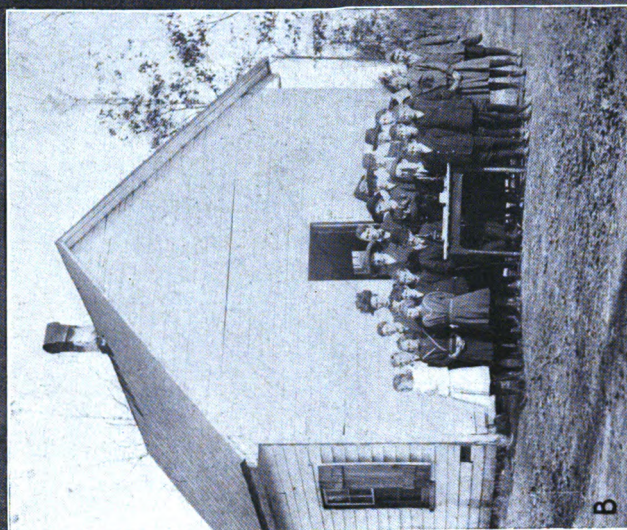


Fig. 34—*a.* A group that drove 15 miles to the dispensary at Kountze, Hardin Co., Texas, all suffering with hookworm disease. *b.* Examining a school, Caroline Co., Virginia. 1,044 persons treated at dispensaries in this county.

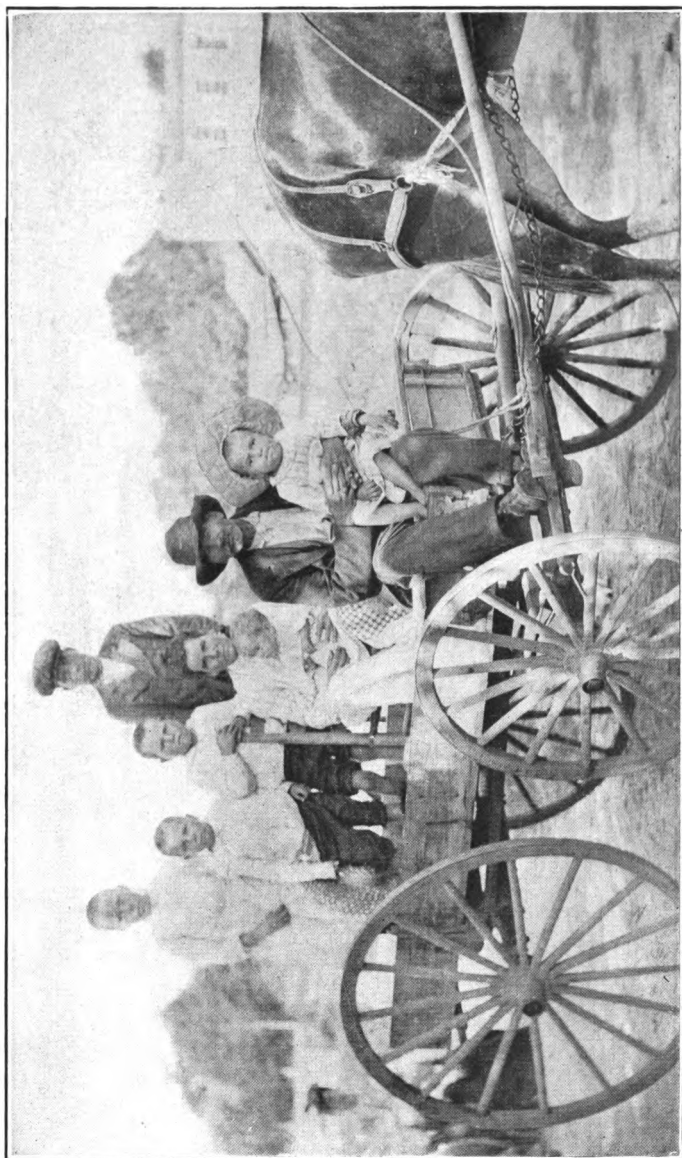


Fig. 37—Amos Raspberry and family, Boardman, N. C. Drove 19 miles to dispensary at Fair Bluff.

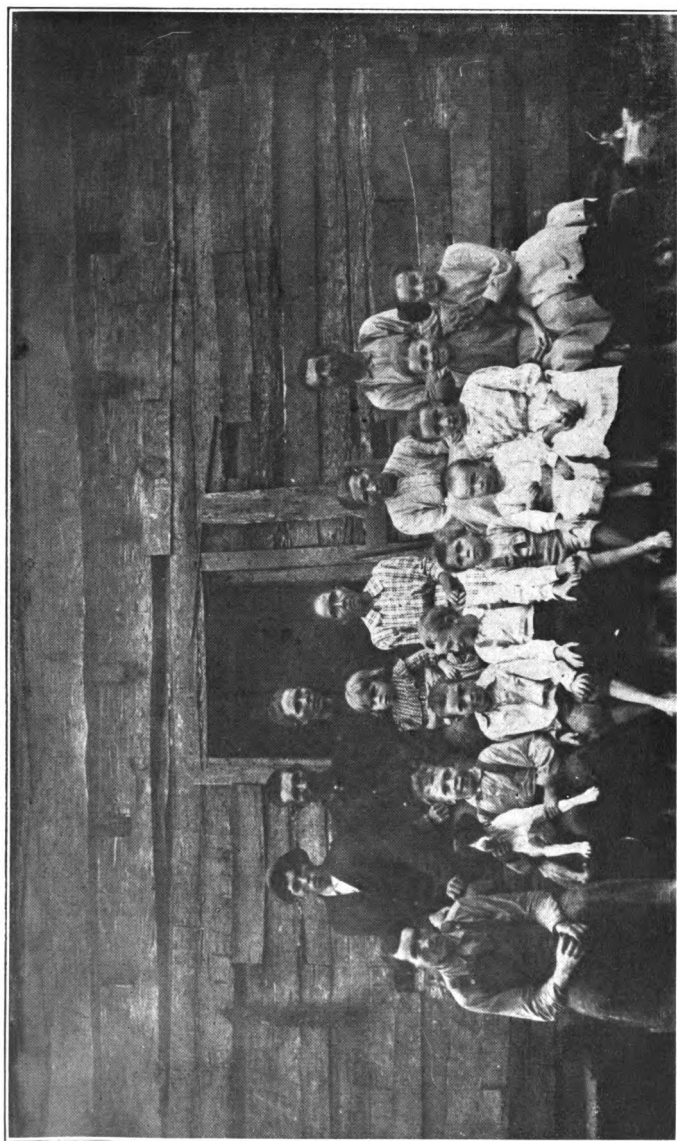


Fig. 38—Illustrating co-operation of the treated patient. Isaacs family, Bell Co. Kentucky. Three generations; all infected; all, save one, treated. Roscoe, holding the dog, gained 21 pounds in 4 weeks after treatment. Frank Isaacs (standing by the door) after being cured got 37 of his family connection and many of his other neighbors treated.

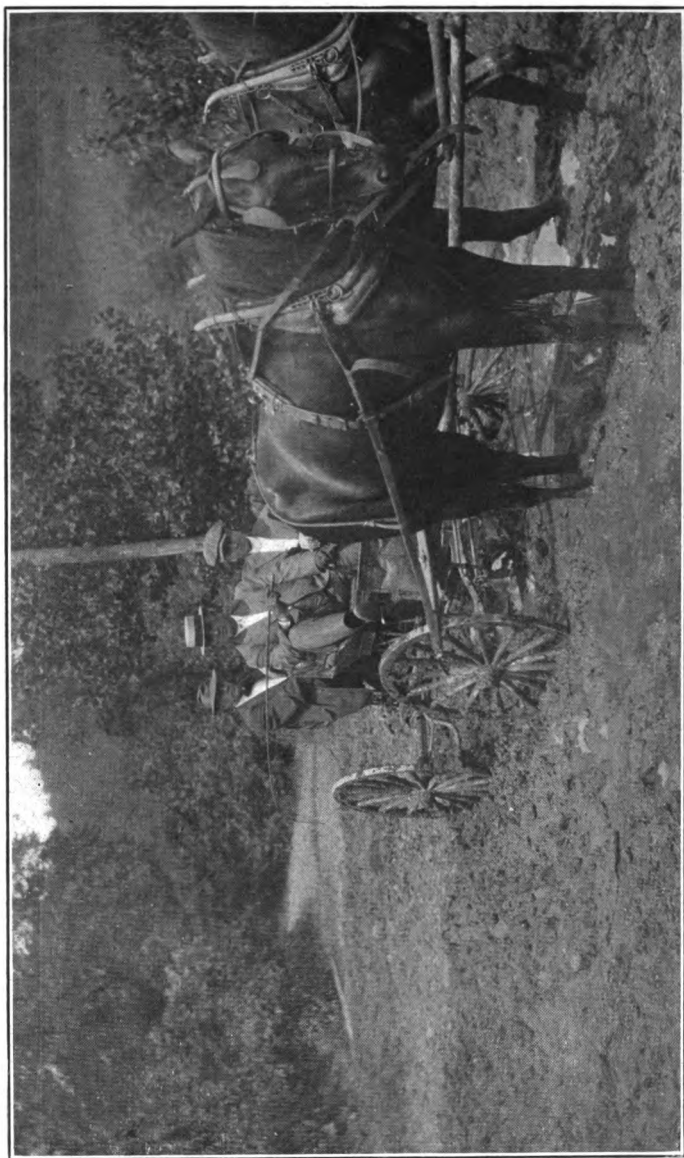


Fig. 33.—Dr. Lock and two microscopists, Knox Co., Kentucky, en route after a day's work where 143 persons were treated for hookworm disease. 3,666 persons treated in county.

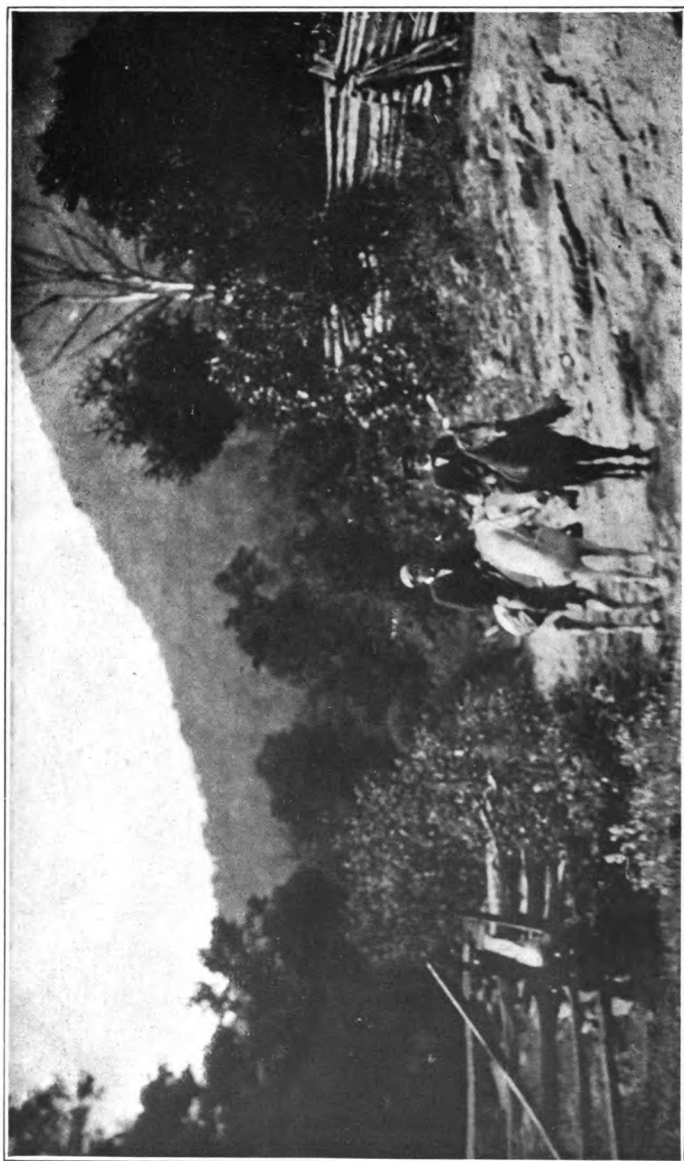


Fig. 40—Dr. Judd and microscopist making the dispensary circuit of Yancey Co., N. C., on horseback, illustrating approved method of travel over mountain roads.



Fig. 41—Teaching sanitation by Farmers' Train. A mountain audience. Gate City, Scott Co., Virginia.

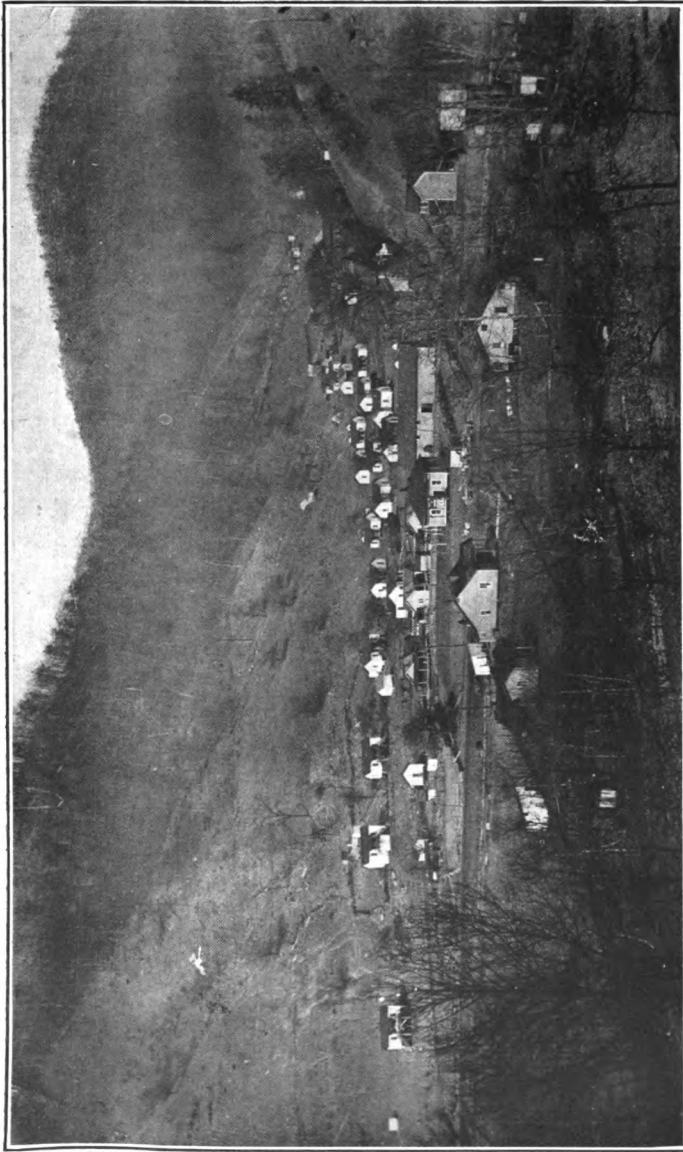


Fig. 42—A mining camp in Bell County, Ky. 255 cases of hookworm disease found here. One of the camps which was put in sanitary condition by the Continental Coal Corporation. See pages 19 and 20.

CHAPTER IV.

A FEW TYPICAL LETTERS AND EXTRACTS FROM LETTERS SHOWING INDIVIDUAL CASES, THE CO-OPERATION OF VARIOUS AGENCIES, AND THE ATTITUDE OF THE PEOPLE TOWARD THE WORK.

I. Letters and extracts from letters by physicians.

(1) *Dr. J. B. H. Knight, Martin County, Williamston, N. C.*—"I have been doing considerable work in the treatment of hookworm with very gratifying results. The free dispensary work in this county did a big work, and this was mainly through the influence of the doctors. I sent in hundreds to be examined. I am in hearty sympathy with the work."

(2) *Dr. Alanson Capehart, Roxobel, Bertie County, N. C.*—Reporting twenty-four cases treated, says: "Proper treatment of these cases have made healthy bodies, bright minds and happy faces out of what were before but human wrecks. The Commission is doing a great and grand work for humanity."

(3) *Dr. George F. Lucas, Currie, N. C.*—"I wish you could see the many bright, healthy children that a year or so ago were without health and with no hope for the future. Words cannot tell the great good that has been accomplished."

(4) *Dr. J. M. Flippin, Mt. Airy, N. C.*—"Six months after the treatment of one of my most interesting cases, the fourteen-year-old boy had gained thirty pounds in weight, two inches in height, worked every day hauling lumber and on the farm. He was entirely cured and made a perfect picture of health. His mother says it's a pleasure to live again."

(5) *Dr. L. H. Schubert, Gibson, N. C.*—"An interesting patient, a girl sixteen years old; undersized, anaemic, poorly nourished, lacked energy and was easily fatigued; had never menstruated. Under first treatment passed a quantity of hookworms. Began to improve, complexion cleared and life and energy returned. After fourth treatment decided improvement; complexion ruddy, full of energy and frolicksome and menstruation appeared for the first time."

(6) *Dr. J. W. Williams, Everett, N. C.*—"Dear Doctor: I honestly believe 60 per cent of the people in my territory are infected and I have tried to teach it to them. You ask for a report on an important case, but first let me tell you why it was important.

"The people in a certain large neighborhood had never heard of a hookworm. I attended services at a church out that way and naturally noticed such a pale crowd of people I made the remark that 90 per cent of the ones present had hookworm. Oh, no! They wouldn't let a new doctor who said they were "wormy" come in their house. In other words, I was directly up against it in that good neighborhood, and a new man; but I didn't take it back—only prayed for a chance to begin to prove it. Here's the case:

"Young girl about seventeen years old, but looked and acted about seventy, was brought to me by her uncle, who lived in

and was a leader of the above-mentioned neighborhood; but the girl's home was in South Carolina. The patient was a perfect picture of a hookworm case, but not a mild one. Had no appetite, anaemic—but that hardly expresses it. She looked as if she had been eating dirt for years; had no hair on her body, and out of breath from the least exercise, etc., etc.

"I knew my prayers were answered and must fill my part of the contract. I made no mistake with my thymol. She got her share. Also tonic. Also hookworm lecture that would make Stiles pay attention. They came, they saw—I conquered. Second treatment in two or three weeks, and when that girl left here no one could tell it was the same girl. On arriving at home (South Carolina) her own mother didn't know her, and in one week sent her son to visit his uncle and let the doctor work on him. Best advertisement I ever had; did me good and will do them good. Now they do not get mad but are actually tickled when they know they have them. for they know it is no guess work when they are treated and are sure of becoming better looking, better feeling and just better men, women and children."

(7) *Dr. V. M. Cooper, County Superintendent of Health, Sampson County, Clinton, N. C.*—"Dear Dr. Ferrell: I take pleasure in informing you that the recent dispensaries for treating hookworm disease in Sampson county, conducted by Dr. C. F. Strosnider, of your staff, proved to be of incalculable good to our county from every standpoint. To the infected children of the poor the actual treatment given has been worth many times the cost. But I believe that even greater good has been accomplished in arousing the people to a sense

of the need for better sanitation and hygiene in everyday matters.

"Not a single complaint, even among the most miserly, has been heard."

(8) *Dr. D. C. Absher, Health Officer, Mt. Airy, N. C.*—
"Dear Dr. Ferrell: I want to say a few words in appreciation of the splendid work done in this (Surry) county by Dr. and Mrs. C. L. Pridgen in conducting the campaign against hookworm disease. In the first place they were very conscientious—they neither wasted their own time nor the money appropriated for the work; they know their work in all the details and are energetic in the doing of it. The work they did in this county will produce results for months and years after they are gone; the educational work along the lines of better sanitation and in the prevention and proper care of cases of tuberculosis and typhoid fever, will prove of inestimable value in all the years to come. As to hookworm in this county, there were thousands of our people who did not know there was such a disease, and even we who were familiar with the disease had no idea that we had as much of it in this county as Dr. and Mrs. Pridgen found. In brief, I can say that their work in this county was eminently successful and satisfactory."

2. Letters and extracts from letters by county health officers.

(1) *Dr. D. W. Jones, County Health Officer, Lincoln, County, Miss.*—"Upon invitation of the county health officer, Drs. Leathers, Whitfield and Little appeared before the Board of Supervisors of Lincoln county on the first Monday in November and addressed that body upon the advisability of tak-

ing up the work in this county. The County Superintendent was also present, and the District Attorney by invitation. The \$200 asked for was promptly voted by the Board, to be expended upon the order of the County Health Officer. This was later supplemented by an additional amount of \$50.

"The State Board of Health proposed to pay the salary and expenses of Dr. Whitfield and the salary of Dr. Buchanan, the county to pay for the medicine, printing and the actual expenses of Dr. Buchanan. Upon this arrangement, work was begun about the middle of November, with Dr. Whitfield in the field, lecturing to schools, public meetings and other gatherings, using the stereopticon whenever possible. The health officer and the Superintendent of Education accompanied him whenever convenient, especially early in the work, giving him their moral support in every possible way. The newspapers were brought into requisition, with special editions, current reading notices, and the mails were used freely, taking the R. F. D. lists to reach the farmers.

"After a lecture Dr. Whitfield would offer vials for obtaining specimens, furnishing mailing cases, ready stamped and addressed to himself for return of same. Reports were made by mail generally through the teachers. He also made engagements to meet the pupils at various schools on certain days of the week for giving the treatment. Dr. Buchanan remained in the office at Brookhaven, where he made a complete microscopical examination of every specimen and dispensed the treatment to those who came for it. There was no haphazard or guess work about this, but the most thorough scientific work. A complete record was kept of every case, showing name, age, sex, school and teachers, family physician, address of parent or guardian, whether positive or nega-

tiye examination, and number of treatments taken. The county health officer was in constant touch with this work, often checking the examinations, using centrifuge when usual examination proved negative. After this work was completed a triplicate copy was filed, one copy for the health officer, one for the Superintendent of Education, one for the Board of Supervisors. The county health officer followed the work up with a letter, offering to continue the treatment under certain conditions, and lists of children infected in the several communities were mailed to the several physicians in whose baliwick they live, with the request that they be followed up until cured.

"But, in my judgment, the most important feature of the whole work was the order of the Board, upon request of all the teachers, that the schools be encouraged to build sanitary privies by allowing an appropriation of all the money left in the school fund at the end of the year for the purpose of building such privies.

"Upon the whole, it was as complete an example of what the State Board of Health can do for the public good as could have been given to the people of this county.

"There were 3,158 people examined for hookworm in Lincoln county, and 2,063 were found infected with this disease. Of this number 1,723 took one treatment, 1,474 had two treatments, and 1,373 took three treatments. The good that was done in this county is incalculable."

(2) *Dr. D. B. Stevenson, County Health Officer, Lumberton, Lamar County, Miss.*—"I am informed that your Board is thinking of making an appropriation to eradicate the hookworm in your county at their next regular meeting, and feeling a keen interest in this important work I am taking the

liberty to write you about the work that has just closed here.

"This county, Lamar, was one of the first in the State to make the appropriation, which they did by giving us \$150 at their regular May meeting. Under the direction of Dr. R. N. Whitfield the work was begun as soon as possible and was carried along from week to week until the entire county had been pretty thoroughly worked. This being the initial work in the State we would naturally be a little slow in coming in for treatment. In the face of this Dr. Whitfield treated about 1,700 in about five weeks, and we had some medicine left after we had finished our labors. A part of the appropriation was never needed. I mention this to show you how very little it costs to have this work done.

"I have had occasion to investigate some of the good results of this treatment, and one would be surprised to note what a different state of affairs exists already as compared to that of ten weeks ago when this work was begun. We, of course, have not had time to see the best results yet.

"The members of our Board of Supervisors to a man say that they have never made an appropriation that did as much for the county as this. They are more than pleased with the results, and surely the medical profession of the county is. Besides this I have never heard one dissenting voice from a single tax-payer.

"It might be of some interest to you to state that the Board of Supervisors of Pearl River, our sister county, at their last meeting appropriated \$150 with which to do this work. They were prompted, I understand, more by the good results we had obtained in this county than by any pressure that was brought to bear on them from other sources.

"I hope your body will not believe that I am undertaking to

get beyond the bounds of propriety when I write this letter, and am sure you will not. I have, as I stated in the beginning, seen the good results of this work and am an enthusiastic advocate of it. I believe that all good people owe it to themselves and their country to do all possible to encourage and support anything that will be of the best benefit to our people.

"In conclusion, I desire to say that if you good people make this appropriation I am sure you will never regret it. The work will be under the direction of a man whom I know to be in every way capable, an energetic and untiring worker, and a man who will certainly get you results.

"Asking your indulgence for this rather lengthy communication, I am, Yours verily truly.

"MR. J. E. ODUM,
Collins, Miss."

3. Letters from members of County Boards of Supervisors and other officials.

(1) *F. B. Pierce, Chairman Columbus County (N. C.) Board of Commissioners, and F. T. Wooten, County Superintendent Schools.*—"It gives us much pleasure to write you that the hookworm dispensaries conducted by Dr. C. L. Pridgen in our county something over a year ago, in every way gave entire satisfaction. Hundreds of children infected with the hookworm disease were treated, and the decided benefits these children received are the strongest evidences of the worth of Dr. Pridgen's work.

"Even far greater good than this has been accomplished. Our people have become aroused as never before in sanitation

and all other matters that pertain to the improvement of health conditions."

"DR. JOHN A. FERRELL,
Raleigh, N. C."

(2) *J. D. Hatten, Member of Board of Supervisors, Sumrall, Miss.*—"I want to say that we had one family on the pauper list that we were paying \$12 per month, and, in addition, the doctor's bills. They were treated by you for hookworm disease, and we have now taken them off the pauper list. They are making their own support, and I could give you many other expressions of appreciation.

"DR. R. N. WHITFIELD,
Collins, Miss."

(3) *Letter from one County Commissioner to a Commissioner in an adjoining county*—"I understand that your Board has in contemplation the establishment of hookworm dispensaries in your county. Of course, you know that you do not pay for anything except the medicines and probably traveling expenses of the assistant. If you had to hire this work done and pay for all expenses it would cost probably several thousand dollars. Having had the service in Craven county (Mississippi) I am particularly anxious that you should have the service in your county. If you could see the thousands of children that were treated in this county for almost nothing, and the great improvement that has resulted from the treatment, I feel sure that your county would not only have the service, but that you would extend it like we did in Craven. There is nothing that concerns your county or is of as much value to your citizens as good health; the children cured of hookworm will produce for your county each year

more than you have to pay out. I have no doubt that there are thousands in your county that are suffering from this disease, and they can be cured, and I hope that your Board will look favorably upon this matter.

"I am taking this liberty to write to you because you are so near Craven that we feel that we have similar interests. There is one family in Bridgeton, just across the river from New Bern, that was infected; we think there were five in all; these children look rosy now, where before they looked like cakes of tallow. We certainly hope that you will not let this opportunity pass, and assure you that Craven county will undertake the same thing next spring if the present Board is returned. Kindly pardon the liberty taken in writing this letter, but I am only doing it through my interest in the welfare of the country around this section."

(4) *S. L. Rhyne, Chairman Board of County Commissioners, Catawba County, N. C.*—"Our people generally were greatly pleased with the hookworm campaign. Not a complaint has been heard on account of the small appropriation made by our Board. We are under obligations to you and your department for coming to us with this matter.

"If it will be worth anything in getting other counties to take hold of the movement, I will say that our Commissioners and the people were so well pleased with the work of your men after they had been among us a while engaged in this work, that we made an extra appropriation to keep the dispensaries open longer. Everybody was pleased with the results.

"I believe the schools will now find it easier to teach the facts about hookworm and other diseases. I think our people

will hereafter be more interested in these things than ever before, for great numbers were treated for hookworm, and now living examples of the good results of treatment are always present. It is a great work. Thank you and your force for this help.

"DR. JOHN A. FERRELL,
Raleigh, N. C."

(5) *Allen J. Barwick, Mayor of Newton, N. C.*—"The campaign for hookworm treatment in Catawba county has just ended. You have doubtless had many evidences of its success, but I want to tell you that, in my opinion, the County Commissioners never made an appropriation for any work in the county that met with more nearly complete approval than that in this instance. I have recently been in nearly all sections of the county and I heard much of the work of your field men, and without exception I heard only words of commendation.

"Many of our people have lately been talking of the employment of a competent, progressive physician, at public expense, for all his time, so that this work of health education may go on. I believe this will come, and it would take only about one more campaign like the recent one to bring us the assurance of such health officer. Interest in public health and hygiene has certainly been awakened more by the hookworm campaign than ever before. The work had a wonderfully helpful effect and I wish we could keep up the health work in some vigorous way.

"In the town of Newton, after the hookworm campaign got well under way, I found it an easy matter to have all open privies closed and made more sanitary by ordinance of the town aldermen. More lime and ashes are being used, and

our sanitary officer finds it easier to keep the town clean, and co-operation is now much more ready in any movement for sanitation.

"The many good results of your work in the county can not be told; it has awakened interest in better health conditions that will continue to grow. We can certainly see immediate results here in the town. A very large number of our people of all classes were examined and, as you know, not a few treated. I will tell you more of the work when I see you.

"DR. JOHN A. FERRELL,
Raleigh, N. C."

(6) *Report of the Chairman of the Board of Commissioners of Craven County (N. C.) in reference to the work of the Hookworm Commission*—"The Board ordered the expenditure of \$300 for medicine to be used in the treatment of persons suffering from hookworm. The Hookworm Commission established dispensaries at New Bern, Vanceboro, Cove, Fort Barnwell, Havelock, Riverdale and one or two other places in the county, under charge of Dr. C. F. Strosnider. The total amount expended under this appropriation was \$191.13. There were 4,242 examined and 2,664 treated. The value of this treatment is inestimable. No doubt the great majority of the number treated would have been rendered useless, mentally and physically, by the action of the disease. The pale, weak and inefficient mental and physical sufferers have been replaced by energetic, rosy-cheeked, clear-minded subjects. No doubt our population has been affected by this disease for many years, and this in great part accounts for the mental and physical disability of many of our school children. We recommend that this treatment be repeated in the spring of 1913.

"The Board is considering the employment of an energetic County Superintendent of Health, to give his entire time and attention to this department, his general duties to embrace inspection of all public buildings and grounds; source of water supply; to examine the school children for physical and mental defects, such as defective eyes, ears, nose, throat, heart and lungs; to look after the indigent sick; to investigate all outbreaks of typhoid fever, diphtheria, scarlet fever, etc.; to deliver lectures on hygiene and sanitation to school children, and to make such recommendations to the Board of Commissioners and the County Board of Health as will work for the preservation of the health of all the people."

4. **Letters and extracts from letters by teachers, school officials and editors.**

(1) *Exhibit from two institutions showing difference in efficiency which seems to have been caused by a light infection:*

- | | |
|---|--------|
| (a) Average grade of 56 girls who were
found infected | 77.75% |
| (b) Average grade of 56 girls taken at
random not infected..... | 89.28% |
| (c) Of two sisters in this college, grade
of one infected..... | 78. % |
| Grade of other not infected..... | 87. % |
| (a) 5 young men not infected (ages 20 to
28), average grade..... | 92.2 % |
| 5 young men infected, average grade.. | 89.8 % |
| (b) 5 boys not infected (ages 12 to 17),
average grade | 84.2 % |
| 5 boys infected, average grade..... | 81. % |
| (c) 25 men and boys not infected, average
grade | 86. % |
| 25 men and boys infected, average
grade | 84. % |

(2) *A. J. Caldwell, Principal Hammond High School, Hammond, La.*—"As you suggested, I have observed closely some of the children whom you treated in my school for hook-worms last spring. In the case of a great many of them there has been a decided improvement. The little girl in the fifth grade who was so pale and weak as to make it impossible for her to be in school regularly, soon became well and rosy and closed the session at the head of her class. A young lady in the high school was in poor health and did very poor work; this session she is well and is one of our best students. A boy in the seventh grade took the treatment with equally as good effect. I could mention others. You are doing a great work for education as well as for good health.

"DR. G. B. ADAMS,
New Orleans, La."

(3) *Miss Minnie B. Barner, teacher in rural school in Winn Parish, La.*—"It has not been quite two months yet since these children were treated, but in many I can see a great change. My attendance is better and also better interest and work. Now when the bell rings they are up and out with a whoop, and when they return it is with a flushed face and laughing countenance, showing that they have enjoyed their play. A careful record kept of the progress of these children two months after treatment shows a gain of 5.25% on class work, 8.75% on examination, and a gain of 2% on attendance."

(4) *C. C. Wright, Superintendent of Schools, Wilkes County, N. C.*—"It gives me much pleasure to state that the work here in Wilkes county was a most decided success, several thousand cases being examined, and over one-half of

These were infected. Much good has been accomplished and the people are well pleased with the expenditure for this work.

"DR. JOHN A. FERRELL,
Raleigh, N. C."

(5) *Extract from editorial in county paper of Hardin county, Texas*—"There were five hookworm hospitals in the county and each one was visited by the doctor six different days. Following are the places and the number of persons examined:

"Village Mills, 312 persons examined and 206 found to be infected; Saratoga, 455 examined and 234 found to be infected; Silsbee, 567 examined and 361 found to be infected; Honey Island, 255 examined and 133 found to be infected; Kountze, 448 examined and 205 found to be infected; total number of persons examined in the county was 2,037, and the total number found to have hookworms was 1,140, making a percentage of 55 1-9 infected. There were, however, 1,514 treatments during the stay in this county.

"In our opinion it was far-reaching and far-seeing on the part of the Commissioners' Court to appropriate the small amount of \$300 toward paying the expenses of operating these hospitals in the county and freeing the county of one of the evil infections which saps the life-blood from the young boys and girls of our country. Three hundred dollars was never spent for a better purpose."

(6) *W. H. Smith, State Supervisor of Rural Schools, Miss.*—"I am thoroughly convinced that the economic prosperity of the people, the lives and health of thousands of school children, and the progress of educational development of the

State depend largely on the successful eradication of the hook-worm. The physical and mental growth of hundreds of children have already been made possible through this work, and there are still thousands suffering retardation and even stunting of their mental and physical powers on account of the ravages of the disease.

"One very favorable sign of the good results from your work is the awakening among school officials as to the need of better sanitary conditions around the school buildings. Many communities have caught the spirit, and are voluntarily providing sanitary privies and taking every precaution to prevent soil pollution. As a result of the campaign work and the bulletins issued by the State Board of Health for use in the schools, the Department of Education, through its field agents and institute directors, is preaching the gospel of better health conditions in every nook and corner of the State.

"The fact that the free dispensary at Columbia was a success from the beginning and was not able to take care of all the applicants for treatment is an indication that public sentiment has been awakened to the importance of the work.

"DR. W. S. LEATHERS,

Jackson, Miss."

CHAPTER V.

REPORT OF THE SCIENTIFIC SECRETARY.

Addresses and clinics.—During the year 1912 I have given 86 addresses or clinics on the subject of hookworm disease and soil pollution, and, in addition to the foregoing, one of my assistants has substituted for me in 10 addresses and demonstrations.

Lantern slides.—As the various State Boards of Health were well supplied with lantern slides in 1911 it has been necessary to distribute only a few new sets this last year.

Charts.—There has been such a demand for the charts on hookworm disease and soil pollution, issued by the U. S. Public Health Service, that Congress decided to issue a special edition of 5,000 for use more especially in the public schools. The Congressional edition in question has been published and many sets have been distributed to various colleges, schools and health officers in the infected district.

Microscopic diagnosis.—On several occasions during 1912 it has become necessary to place every available assistant at work to help out the State boards of health in an unusual rush in connection with their microscopic diagnosis.

In general my office has had much less regular work in the line of microscopic examination than in former years, and most of the cases that reach us now are those in connection with which either practicing physicians, or microscopists con-

nected with the various State boards of health are in doubt as to the nature of the findings.

Correspondence.—From the letters that have reached my desk during this past year it is very clear that there is increased interest in sanitation throughout the United States; letters come to me from all parts of the country making inquiries and offering suggestions regarding different types of sanitary privies.

Index to literature.—In my last annual report reference was made to an index to the world's literature on hookworm disease, then in course of preparation. This index is now practically completed and enables me to give the references to literature to any correspondent who may desire information on particular phases of the subject.

Field work.—Nearly all of my time for about three months of this past year has been occupied in a special study of the children in five rural schools in County Z—, in one of the South Atlantic States, and for three months of the year I was occupied with work at the Marine Hospital in Wilmington, N. C. For certain reasons it seems best not to give the plans and details of the field work in the present report, but some time this coming spring or summer the facts will be ready for publication.

Investigations.—Among the results obtained from recent investigations on hookworm disease, mention may be made of the following:

(a) *The Effect of Hookworm Disease on the Menstrual Function.*—Recently I have had the opportunity of examining into the menstrual history of 129 females in a hookworm infected village and of obtaining some rather instructive data on this point.

Among our Southern girls we may find the menses beginning at 11 years of age, or even earlier, but in a considerable number of instances the courses do not appear for some years later. It is very common, especially on the tenant white farms and in the factories, to meet girls of 16 years of age who have never menstruated. The oldest case of absolute amenorrhea in this class known to me was 26 years old.

It is also frequent that we find Southern girls who are very irregular in their menstrual periods. This statement holds especially for the tenant whites and factory girls and, to a less degree, for girls in other walks of life.

One of the commonest causes of amenorrhea and irregularity, especially when it is of the delayed type, is hookworm disease, and experience demonstrates that this fact is too frequently overlooked by practicing physicians, especially by some who have ignored the investigations of recent years and who treat for symptoms instead of for causes. As a very striking case of this kind may be mentioned a 20-year-old girl who had never menstruated; according to the statement of her mother, she had been under treatment for amenorrhea by eight different physicians, not one of whom recognized hookworm disease as a factor in the case, although she was a typical hookworm patient whose real trouble was recognized at a distance of 30 feet. The girl was treated for hookworm disease and her menses promptly became established. According to the statement of the girl's father he has been kept a poor man because of the doctor's bills and drug bills incurred on account of this girl.

That the average physician does not fully recognize the importance of hookworm infection as one of the many factors in amenorrhea is evident to any person who has had extensive experience with this parasitic infection.

(b) *Leichtenstern's Method of Judging the Completeness or Incompleteness of Cure.*—The late Dr. Leichtenstern, of Cologne, Germany, advanced the view that by counting the male and female hookworms passed by a patient and finding the proportion between the sexes the clinician has a practical clue to the completeness or incompleteness of the cure effected.

If this view be correct we would have in the Leichtenstern procedure a method that might be of considerable practical value in certain cases that are today somewhat difficult to understand.

It has recently been possible to test the method in question by a study of 102 cases of infection involving 13,080 specimens of the American hookworm. The worms passed by each case were classified as to their sex, and it was found that 46% of the specimens were males and 53% females. Of the 102 cases examined, 37 presented an excess of male parasites, 9 presented an equal number of males and females, and 56 presented an excess of females. Leichtenstern's method is based upon the premise that the female parasites are always in excess of the males in a fairly constant proportion. Whatever may be the exact facts as applied to the Old World Hookworm (*Ancylostoma duodenale*), it will be seen from our investigation on the New World Hookworm that the premises as based upon Leichtenstern's theory do not obtain in the 102 cases of infection with *Necator americanus* examined. The conclusion must therefore be drawn that Leichtenstern's theory is not of practical application to our hookworm campaign in this country.

(c) *Treatment.*—The standard routine of treatment for hookworm disease is as follows:

First day 6 or 8 P. M. Epsom salts.
Second day 6 A. M. $\frac{1}{2}$ of the total dose of thymol.
 8 A. M. $\frac{1}{2}$ of the total dose of thymol.
 No breakfast.
 10 A. M. Epsom salts.
 Noon. Light lunch.

During this past year I have had occasion to follow several hundred thymol administrations and to notice the symptoms of which the patients complained, and also to notice the nature of the stools that they passed. The studies in question have led me to adopt in my own work three modifications of the standard routine of treatment.

First day, Epsom Salts.—The Kentucky State Board of Health recommends the use of salts on the evenings of two days preceding the thymol. This recommendation has a great deal in its favor, although in my own personal experience in North Carolina I seem to have had less success in getting the people to take two doses of salts at their home.

For about two years I have been testing a somewhat similar modification, as follows: 5 P. M., Epsom salts, followed by copious drinks of water; 6 P. M., light supper; 8 P. M., Epsom salts, followed by copious drinks of water.

Up to the present time I have not reached any conclusion as to whether either one of these methods, namely, two doses of salts on the same day or on successive days, is superior to the other, but I have reached a very definite conclusion that much of the complaining made as to the weakening effects of the Epsom salts is due to the fact that the people do not take this drug properly, and that if more detailed instructions are given on this point there will be less complaint in regard to the salts.

Salts can be given in concentrated solution, that is to say, dissolve the salts in the smallest quantity of water possible, one (1) tablespoonful of Epsom salts can be dissolved in one (1) tablespoonful of water. This reduces to a minimum the amount of unpleasant fluid to be swallowed.

Immediately after swallowing the concentrated solution of salts it is highly desirable to drink abundantly of water, because the salts are dependent upon fluid for their successful action, and if this fluid is not supplied it will be taken out of the blood, and thus the patient may experience unpleasant effects. If, however, abundance of water is swallowed the patient usually experiences very slight, if any, effect from Epsom salts.

It does not seem wise to give water so abundantly after the morning dose of salts following the thymol.

Division of the Dose of Thymol.—For practical as well as theoretical reasons, in order to increase the element of safety to the patient, I have adopted the regular routine of giving 1-3 of the dose of thymol at 6 A. M., 1-3 at 7 A. M., and 1-3 at 8 A. M. instead of $\frac{1}{2}$ at 6 A. M. and $\frac{1}{2}$ at 8 A. M., as usually practiced.

By the three-dose method we obtain the same number of grain-hours for the drug in the intestines as by the two-dose method. In cases, however, in which we are dealing with a patient who shows an idiosyncrasy to thymol, or in case for any other reason symptoms of thymol poisoning develop, the three-dose method presents the advantage of enabling us to discover the idiosyncrasy or symptoms more promptly and at a time when a smaller dose of thymol is in the system. It further enables us to give instructions to the people who take the dose home whereby they may regulate the dose more ex-

actly. For instance, suppose a patient is to receive 30 grains. By the old method he would receive 15 grains at 6 A. M. and 15 at 8 A. M. By the three-dose method he would receive 10 grains at 6 A. M., 10 grains at 7 A. M., and 10 grains at 8 A. M., but if any unfavorable symptoms develop after the first dose he can omit the second and third, and if any unfavorable symptoms develop after the second dose he can omit the third dose. After trying the two methods on a number of patients I am very decidedly in favor of the three-dose method.

Diet.—Nearly all persons who treat for hookworm disease warn the patients not to drink much water and not to take any food until noon on the day they take thymol.

In following out this usual practice with the children I have experienced a great deal of complaint, and in an effort to make the children more contented under treatment, and therefore more willing to repeat the dosage when necessary, I have modified the usual procedure as follows: During the morning of thymol administration the patients are permitted to swallow water only in very small amounts, if any. It is of course necessary to let them have some water when they take their capsules. At about 9 o'clock in the morning, namely, one hour after the third thymol, the patients receive a cup of coffee, without milk; and at 10:30, namely, about one-half hour after the morning salts, they receive one or two cups of coffee (without milk), but with crackers. Since instituting this modification I have had much less complaint on the part of the patients, and I have not been able to discover that the procedure interferes in the slightest in the treatment.

Sizes of the Doses of Thymol.—Very frequently some author urges that the dose of thymol be increased above the dose now usually accepted as standard, but conversation with

our field men seems to indicate that they prefer not to increase the dose. Statistics on the hospital cases at Wilmington lead me to concur most heartily with those field men who prefer the smaller doses. Observation shows that in a considerable proportion of cases the patients are cured with 1-3 or 2-3 of the standard dose, and certainly in such cases it is unnecessary to increase the amount of thymol given.

Subjective Symptoms.—An article will shortly be published giving the subjective symptoms noticed in several hundred thymol administrations. The summary of the cases is not quite ready for insertion in this report.

(d) *Blood Pressure*.—One of my colleagues, Dr. Worth Hale, has recently taken a number of blood pressures among hookworm patients before treatment. It is proposed to repeat the tests a little later, after the patients have been treated. Results will be reported upon later in the year.

(e) *Chemical Work on Thymol*.—Like many other drugs which have found particular applications in medicine, the use of thymol for the treatment of hookworm disease has had a more or less empirical development. As compared with various other drugs which have been suggested as vermifuges, experience has shown that for certain cases thymol has certain advantages over practically all of them. Although this compound has proved very efficient in the hands of competent persons, its careless use is attended with certain dangers, and, as has been frequently pointed out, there is great need for a safer and more efficient remedy for hookworms. One which could be taken without special precautions, without diet restrictions or accompanying purgation, would undoubtedly simplify immensely the successful eradication of the hookworm scourge.

It is possible that such a drug may at some time be accidentally discovered in much the same way as thymol was selected, but there is undoubtedly much greater possibility of developing such a remedy by means of careful laboratory studies. It was with this object in view that the chemical and physiological experiments here mentioned were undertaken by two of my colleagues, Dr. Atherton Seidell and Dr. W. H. Schultz, in the Hygienic Laboratory of the U. S. Public Health Service.

As preliminary to a rational search for a better vermifuge than thymol, it was realized that more information in regard to the method of action of thymol itself was necessary. The most direct way, to gain information of this character is by ascertaining to what extent and in what form the administered thymol is discharged by the body. Studies of this character require, first of all, a trustworthy analytical method which may be applied to the determination of thymol in such products as feces, urine or other secretions of the body. A search of the literature indicated that three methods of possible applicability to thymol have so far been proposed. Studies upon these, however, soon indicated that none of them could be made to yield reliable results. From an analytical standpoint the quantitative estimation of thymol presents difficulties particularly on account of its extreme volatility and the instability of the few relatively insoluble compounds which it forms. Methods based upon removal by precipitation, filtration and drying to constant weight, of thymol itself or its compounds, are therefore excluded, and it was necessary to resort to reactions which could be measured in dilute solutions. After quite a long series of experiments a method based upon the reaction of thymol with bromine was developed, but its application was limited to aqueous solutions of thymol free of other sub-

stances which might also react with bromine. Fortunately, however, the extreme volatility of thymol with steam permitted its removal from most interfering substances and in connection with steam distillation the new method has so far been of very great service.

In seeking to apply the newly developed method to the several body waste products, attention was first directed to the feces, since according to most preconceived conceptions of the action of thymol on intestinal worms it was expected that a very considerable amount of the administered drug would be found unchanged in the feces. In applying the method to feces a number of difficulties were encountered due to volatile products other than thymol. Provisions for retaining these were introduced one by one, and finally hydrogen sulphide was itself held back by means of a lead salt, and a perfectly clear and nearly odorless distillate was obtained at the end of the multiple steam distillation apparatus. Control determinations were made upon the feces of dogs which had received no thymol and upon such samples to which known amounts of thymol were added. The results showed that these added amounts could be satisfactorily recovered. Thymol was then administered to a series of dogs and the samples collected and analyzed according to this method. The results showed that less than 10 per cent of the administered drug was excreted *unchanged* in the feces. It must therefore be concluded that about 90 per cent of each dose of thymol is either decomposed or absorbed from the alimentary tract, a proportion which was certainly not anticipated on the basis of clinical observations.

Following the analyses of the feces, efforts have been made to determine the thymol in the urine. Greater difficulties have been encountered, and so far the last of these have not been

overcome. The work has shown conclusively, however, that free thymol does not occur in the urine, but only combined or, what may be considered, neutralized or non-toxic thymol is present. This neutralizing agent, glycuronic acid, appears to stand ready to render harmless the poisonous thymol, and takes care of it all unless it is supplied too quickly, as may occur when oils or fatty substances are also present in the alimentary tract.

In connection with this effect upon the absorption favored by oils, a series of experiments has been made upon the distribution of thymol between water and oil. It has been found that for most of the edible oils the ratio of the solubility is about as 1 to 400. Therefore a given amount of thymol added to a mixture of equal volumes of water and oil will distribute itself so that only 1-400th of the total amount remains in the water. The presence of dilute acid, such as contained in the gastric juice, would diminish even this small amount appreciably. It would appear that under ordinary circumstances the rate of absorption of thymol from the alimentary tract is taken care of by the neutralizing action of the glycuronic acid, but when oil is present the acceleration may be too great and serious poisoning result.

One other line of investigation which is of more general than of particular interest to the thymol treatment of hookworm disease may be mentioned. It was found that in comparing the toxic dose of thymol administered in various ways, the subcutaneous injection of thymol dissolved in olive oil was least toxic of all. Observation indicated that absorption from the oil was proceeding extremely slowly, and experiments were therefore planned with the purpose of measuring this rate. The results showed a strict parallelism between the partition

coefficient between the oil and water, and the rate of absorption within certain limits, when equal volumes of the solution of thymol in different inert oils contain equal amounts of thymol, the rate of subcutaneous absorption is proportional to the relative saturation of the solvent with thymol.

Some of the results in the foregoing studies are exceedingly suggestive and open up a possible change in our conceptions concerning the mode of action not only of thymol but of other anthelmintics also.

(f) *Biological Work on Necator americanus*.—My colleague, Dr. W. H. Schultz, has performed nearly 1,000 experiments with a view to ascertaining more exactly some of the factors which determine the geographical and seasonal distribution of human hookworms in the United States. These studies, it is hoped, will throw additional light upon the forces that co-operate to enable the eggs to develop into mature larvae and the latter to find their host and complete the life cycle. They deal with some of the barriers that Nature has thrown about the host, which, if taken advantage of, may aid in the avoidance of infection.

Dr. Schultz has systematically studied the reaction of the eggs and of larvae to various inorganic salts, to gases, acids, alkalis, and has determined the killing power of a number of relatively cheap disinfectants. Many of these substances, especially phenols, coal-tar derivatives and free chlorine kill both the eggs and larvae in a relatively short time, so that in cases of emergency a number of these substances might perhaps be of use in sterilizing human excreta, or moist surfaces upon which motile larvae have crawled.

Many experiments have been made with thymol, its derivatives, and with various other vermifuges. The relative toxicity

of these substances has been worked out and considerable attention has been given to the physiologic action of some of the more efficient remedies.

This same investigator confirms our knowledge that high and low temperatures, drying, and bright sunlight are Nature's most potent agents in killing the eggs and larvæ of *Necator americanus* and is able to add new and definite data on this general subject. For example, it is found that temperatures above 42°C. soon render the larvæ weak, inco-ordinate or motionless, the effect being proportional to the increase of temperature and duration of exposure. So that larvæ that have been exposed for an hour or longer to a temperature of 46°C. are either killed or so injured that they are unable to infect the skin and they die soon afterwards, whereas larvæ exposed for one minute to a temperature of 50°C. are either killed within that time or die a few minutes later. He is now extending his experiments to physiologic minimum temperatures.

Part of Dr. Schutz's results will be sent to press in the near future.

Publications.—During 1912 a number of manuscripts have been prepared, and several more that are based upon work this past year are now in preparation. The following manuscripts have appeared in press:

SCHULTZ (W. H.) and SEIDELL (ATHERTON):

1912a. Subcutaneous absorption of thymol from oils. <Original communications, 8th International Congress of Applied Chemistry, v 19, pp. 271-278, 1 fig.

1912b. The determination of thymol in dog feces. <Ibidem, pp. 281-286.

SEIDELL (ATHERTON):

1912a. A new bromine method for the determination of thymol,

salicylates and similar compounds. <Am. Chem. J., v. 47 (6), June, pp. 508-526.

1912b. Solubility and distribution coefficients of thymol. <Ibidem, v. 48 (5), Nov., pp. 453-467.

STILES (C. W.):

1912a. Hookworm disease among cotton-mill operatives. [In Report on condition of woman and child wage-earners in the United States v. 17.] <61st Cong., 2d sess., Senate Doc. No. 645, pp. 9-45.

1912b. The menstrual and pregnancy history of 129 females in a hookworm infected factory village. [Read before South. Med. Ass'n, 5th Ann. Meeting, Hattiesburg, Miss., Nov. 14-16, 1911.] <South Med. J., v. 5 (3), pp. 163-166, Apr.

1912c. The full time county health officer, the most important factor in the public health machinery. <Proc. North Carolina State Med. Ass'n, Ann. Meeting, 1912.

1912d. A cold-blooded inquiry into American patriotism. [Read before Tenn. State Med. Ass'n, Chattanooga, 1912.] <Tenn. Med. J.

1912e. Sanitary conditions surrounding the schools. <Proc. State Teachers' Ass'n of South Carolina, Ann. Meeting, 1912.

The sanitary privy bulletin of the United States Department of Agriculture.—In my last annual report mention was made of the Farmers' Bulletin on the Sanitary Privy, prepared by Dr. L. L. Lumsden and myself, and issued by the United States Department of Agriculture. It will be of interest to the Commission to know that according to the reports of the Editor's office 350,000 copies of this bulletin have thus far been issued.

(PUBLICATION No. 8)

THE ROCKEFELLER SANITARY COMMISSION
FOR THE
ERADICATION OF HOOKWORM DISEASE.

Fourth Annual Report
FOR THE YEAR 1913

OFFICES OF THE COMMISSION
WASHINGTON, D. C., U. S. A.
JANUARY, 1914

THE ROCKEFELLER SANITARY COMMISSION
FOR THE
ERADICATION OF HOOKWORM DISEASE

FOURTH ANNUAL REPORT
FOR THE YEAR 1913.

OFFICE OF THE COMMISSION
WASHINGTON, D. C., U. S. A.
JANUARY, 1914.

THE ROCKEFELLER SANITARY COMMISSION

E. A. ALDERMAN

P. P. CLAXTON

SIMON FLEXNER

H. B. FRISSELL

F. T. GATES

D. F. HOUSTON

J. Y. JOYNER

STARR J. MURPHY

WALTER H. PAGE

J. D. ROCKEFELLER, JR.

WICKLIFFE ROSE

C. W. STILES

WILLIAM H. WELCH

F. T. GATES, *Chairman*

WICKLIFFE ROSE, *Administrative Secretary*

JNO. A. FERRELL, *Asst. Administrative Secretary*

C. W. STILES, *Scientific Secretary*

L. G. MYERS, *Treasurer*

STATE HEALTH FORCES

MEMBERS OF STATE BOARD OF HEALTH

Medical Association of the
State of Alabama

EXECUTIVE OFFICERS*

ALABAMA

W. H. SANDERS, M. D.,
State Health Officer.

W. W. DINSMORE, M. D.,
*State Director for Sanitary
Commission.*

P. B. MOSS, M. D.,
*State Bacteriologist and
Pathologist.*

FIELD DIRECTORS

J. Fraser Orr, M. D.
H. L. Wright, M. D.
E. V. Caldwell, M. D.
C. A. Grote, M. D.

ARKANSAS

F. B. Young, M. D.
B. A. Fletcher, M. D.
S. A. Southall, M. D.
W. P. Parks, M. D.
G. A. Warren, M. D.
L. A. Buckner, M. D.

MORGAN SMITH, M. D.,
*Secretary and Executive
Officer.*

C. W. GARRISON, M. D.,
*State Director of
Rural Sanitation.*

T. B. Bradford, M. D.
T. M. Fly, M. D.
E. A. Campbell, M. D.

GEORGIA

W. W. Owens, M. D.
A. G. Little, M. D.
Thos. J. McArthur, M. D.
Jas. H. McDuffie, M. D.
Robt. F. Maddox, M. D.
Howard J. Williams, M. D.
R. M. Harbin, M. D.
Samuel C. Benedict, M. D.
Giles Hathcock, M. D.
W. H. Doughty, Jr., M. D.
J. L. Walker, M. D.
M. S. Brown, M. D.
H. F. Harris, M. D.

H. F. HARRIS, M. D.,
*Secretary and Director of
Laboratories.*

A. G. FORT, M. D.,
*Director of Field
Sanitation.*

A. W. Wood, M. D.
C. R. Henry, M. D.
C. H. Verner, M. D.
T. F. Abercrombie, M. D.

*Only the executive officers are named who have some direct connection with the work.

MEMBERS OF STATE BOARD
OF HEALTH

EXECUTIVE OFFICERS

FIELD DIRECTORS

KENTUCKY

J. G. South, M. D.
C. A. Fish, M. D.
O. C. Robertson, M. D.
Charles Z. Aud, M. D.
I. A. Shirley, M. D.
Geo. T. Fuller, M. D.
W. W. Richmond, M. D.
J. N. McCormack, M. D.

J. N. McCORMACK, M. D.,
*Secretary and State
Health Officer.*

A. T. McCORMACK, M. D.,
*State Director of Hookworm
Commission.*

LILIAN H. SOUTH, M. D.,
State Bacteriologist.

J. S. Lock, M. D.
W. W. Richmond, M. D.
I. A. Shirley, M. D.
M. W. Steele, M. D.

LOUISIANA

Oscar Dowling, M. D.
A. H. Gladden, M. D.
T. T. Tarlton, M. D.
Herman Oechsner, M. D.
H. B. White, M. D.
Thomas A. Roy, M. D.
B. A. Ledbetter, M. D.

Oscar Dowling, M. D.
President.

WM. M. PERKINS, M. D.,
Secretary.

SIDNEY D. PORTER, M. D.,
*State Sanitarian and
Director of Hookworm
Department.*

G. M. Trezevant, M. D.
G. B. Adams, M. D.
G. C. McKinney, M. D.
J. D. Baucum, M. D.

MISSISSIPPI

G. S. Bryan, M. D.
John Darrington, M. D.
T. E. Ross, M. D.
E. A. Cheek, M. D.
J. W. Cooper, M. D.
Theodore Borroum, M. D.
S. E. Eason, M. D.
M. J. Alexander, M. D.
J. C. Armstrong, M. D.
W. W. Reynolds, M. D.
W. W. Hall, M. D.
C. E. Catchings, M. D.
J. R. Jiggitts, M. D.
W. W. Smithson, M. D.

E. H. GALLOWAY, M. D.,
*Secretary and Executive
Officer.*

W. S. LEATHERS, M. D.,
Director of Public Health.

C. R. STINGILY, M. D.
State Bacteriologist.

R. N. Whitfield, M. D.
Henry Boswell, M. D.
C. C. Buchannon, M. D.
H. H. Howard, M. D.
R. D. Dedwylder, M. D.

MEMBERS OF STATE BOARD
OF HEALTH

J. Howell Way, M. D.
 Richard H. Lewis, M. D.
 J. L. Ludlow, M. D.
 W. O. Spencer, M. D.
 Thomas E. Anderson, M. D.
 Chas. O'H. Laughinghouse,
 M. D.
 Edward J. Wood, M. D.
 A. A. Kent, M. D.
 Cyrus Thompson, M. D.

EXECUTIVE OFFICERS

NORTH CAROLINA

W. S. RANKIN, M. D.,
*Secretary and State
 Health Officer.*
 C. L. PRIDGEN, M. D.,
*Assistant Secretary
 for Hookworm Disease.*
 C. A. SHORE, M. D.,
*Director State
 Laboratory Hygiene.*

FIELD DIRECTORS

D. C. Absher, M. D.
 John Collinson, M. D.
 G. F. Leonard, M. D.
 H. L. Sloan, M. D.
 B. E. Washburn, M. D.

SOUTH CAROLINA

Robt. Wilson, Jr.,
Chairman.
 D. B. Frontis, M. D.
 C. C. Gambrell, M. D.
 E. A. Hines, M. D.
 W. J. Burdell, M. D.
 Wm. Eggleston, M. D.
 W. M. Lester, M. D.
 W. W. Dodson, Ph. G.
 Thos. J. Peeples,
 A. W. Jones.

JAMES A. HAYNE, M. D.,
*Secretary and State
 Health Officer.*

J. LA BRUCE WARD, M. D.,
Director Rural Sanitation.

F. A. COWARD, M. D.,
Director of Laboratories.

F. L. Routh, M. D.
 T. J. Howell, M. D.
 F. D. Rodgers, M. D.
 L. A. Riser, M. D.

TENNESSEE.

R. E. Fort, M. D.
 A. M. Gamble, M. D.
 Louis Leroy, M. D.
 Hon. T. F. Peck.

R. Q. LILLARD, M. D.
*Secretary and Executive
 Officer.*

OLIN WEST, M. D.,
*Assistant Secretary for
 Eradication of Hookworm
 Disease.*

T. B. Yancey, Jr., M. D.
 H. R. Townsend, M. D.
 J. M. Lee, M. D.
 W. P. Robinson, M. D.

WILLIAM LITTERER, M. D.,
State Bacteriologist.

MEMBERS OF STATE BOARD
OF HEALTH

Ralph Steiner, M. D.
 B. F. Calhoun, M. D.
 Hugh McLaurin, M. D.
 K. H. Beall, M. D.
 B. M. Worsham, M. D.
 A. W. Fly, M. D.
 S. M. Lister, M. D.
 R. P. Babcock, M. D.

EXECUTIVE OFFICERS

TEXAS

RALPH STEINER, M. D.,
State Health Officer.

 R. P. BABCOCK, M. D.,
Secretary.

 M. H. BOERNER, M. D.,
State Director of
Hookworm Commission.

 HENRY HARTMAN, M. D.,
State Bacteriologist.

FIELD DIRECTORS

Hubert Ferrell, M. D.
 O. H. Judkins, M. D.
 C. H. Brownlee, M. D.

VIRGINIA

W. M. Smith, M. D.
 S. W. Hobson, M. D.
 J. B. Fisher, M. D.
 A. G. Crockett, M. D.
 T. C. Firebaugh, M. D.
 Lewis E. Harvie, M. D.
 G. B. Johnston, M. D.
 G. B. Lawson, M. D.
 Stuart McGuire, M. D.
 L. T. Royster, M. D.
 Reid White, M. D.
 O. C. Wright, M. D.

ENNION G. WILLIAMS, M. D.
Commissioner.

 ALLEN W. FREEMAN, M. D.
Assistant Commissioner.

MEADE FERGUSON, Ph. D.,
Bacteriologist.

W. A. Brumfield, M. D.
 K. E. Miller, M. D.
 G. A. L. Kolmer, M. D.
 A. C. Fisher, M. D.

CONTENTS

CHAPTER I.—General summary with notes.

CHAPTER II.—Summary of activities and results by States.

CHAPTER III.—Half-tone illustrations.

CHAPTER IV.—Illustrative letters.

CHAPTER V.—Report of the Scientific Secretary.

EXPLANATORY NOTES.

1. In June of the current year, John A. Ferrell, M. D., was elected a member of the administrative staff of The International Health Commission, and was given active direction of the administrative work of The Rockefeller Sanitary Commission in the South.

2. Each State in the beginning employed its own system of records. Conferences for systematizing them were later held, and practical uniformity adopted. This work brought out certain discrepancies in the early reports. In so far as these apply to the work where the county is the unit they have been revised, so that the figures in this report under this heading are based on the revised figures, and not on the figures previously published. A revisal of the records of the work where the State is the unit will be made, as far as practicable, and given in the next annual report. The need for revising under this heading is so manifest in two items that they are being omitted in this report. One applies to the actual expenditure by the State in this particular work; the other to the number of physicians now treating hookworm disease and reporting their cases.

3. The term "number of persons treated" as used in this report signifies the number of persons to whom treatment has been dispensed. Some persons to whom treatment has been dispensed carry the medicine home, but do not take it. It is clearly impossible to correct this error in the record.

4. The number of persons microscopically examined in making the infection survey does not equal the total number of microscopic examinations made in a State. All microscopic

examinations save those of rural children from 6 to 18 years of age are excluded from the reports of the infection survey.

5. A comparison of the total number of persons microscopically examined with the total number of persons treated will not indicate the percentage of persons infected, because during 1910-1912 many members of the staff treated cases on clinical diagnoses, and many of those cases at present treated by practicing physicians have no microscopical examinations made. Table four will indicate the degree of infection found, based on microscopic work.

6. The figures in the tables for the infection and sanitary surveys for 1913 do not all correspond to the figures shown for these surveys in other tables. The figures for 1913 include for certain states, second surveys which elsewhere are omitted. Hence, the seemingly apparent errors are not real.

7. Tables 10-12 include 10,177 persons examined; and tables 13-15 include 13,969 persons treated, which should be shown under the years when the work was done. A lack of uniformity in the early records of the states makes it impossible to segregate them now. As a result the horizontal and perpendicular additions in the tables do not correspond; however, the accuracy of the tables is not altered.

8. The totals given in this report do not include a vast amount of the work that has been done. No record is included of the clinical examinations made by physicians or members of the staff; a large number of microscopic examinations made by the staff before the dispensaries were operated, and many that have since been made in the field, are discarded because no complete, individual case records were made. Those persons who were treated by the staff prior to the opening of the dispensaries in 1911; and those since treated outside the regular dispensary work, are also omitted

for the same reason. This diminishes very materially the results which should be accredited to this health work, but it insures and strengthens the integrity of the records as they are given.

9. Persons who may desire to see how the work was organized and how the various activities were defined and conducted in the early stages of the work are referred to the First Annual Report by the Administrative Secretary. An account of the dispensary and how its work is conducted may be found in the Second Annual Report. The Third Annual Report describes the dispensary exhibit; the co-operation of the people, the physicians, and other agencies. These reports will be sent out on request until the supply is exhausted.

CHAPTER I.

GENERAL SUMMARY WITH NOTES.

1. **Persons Treated, 1913.** The total number of persons treated for hookworm disease in eleven states for the year 1913 is 186,277; an average of 616 persons treated for each working day in the year. The average number for 1912 was 720. This reduction of 14% in the number of persons treated is significant when we consider that the number of persons examined in 1913 represents an increase of 60% over 1912. The territory covered during 1913, as a whole, had lighter infection than that covered in 1912; yet some of the territory has been covered the second time and the results seem to indicate that the work of the health forces during the past four years accounts, in a measure at least, for this showing.

State.	Persons Treated 1913.
Alabama.....	11,702
Arkansas.....	4,894
Georgia.....	15,739
Kentucky.....	43,211
Louisiana.....	16,858
Mississippi.....	23,262
North Carolina.....	33,840
South Carolina.....	11,066
Tennessee.....	7,167
Texas.....	10,717
Virginia.....	7,821
Total.....	186,277

2. Persons Treated, 1910-1913. The total number of persons treated for hookworm disease in eleven states for the four years is 539,107.

This means the treatment of 369 persons a day for every day in four years.

State.	Persons Treated 1910-1913.
Alabama.....	40,540
Arkansas.....	8,838
Georgia.....	40,782
Kentucky.....	65,314*
Louisiana.....	42,675
Mississippi.....	96,857
North Carolina.....	143,329
South Carolina.....	47,271
Tennessee.....	15,137
Texas.....	18,245*
Virginia.....	20,119
Total.....	539,107

These figures include the persons treated by the staff, and by practicing physicians who voluntarily report their treated cases. The physicians as a rule do not keep a record of their treated cases, and many do not report regularly. Quite a number who are known to treat the disease never report, so that although the number of treated cases may not be absolutely accurate, the probability is that more cases have been treated than have been reported.

The members of the staff keep an accurate record of every person microscopically examined, every person infected, and every person treated; the size of the dose of thymol, and the date of each treatment.

*Work begun in 1912.

PERSONS TREATED.

Year	By Physicians	By Staff	Total
1910	8,000	.....	8,000
1911	46,600	66,752	113,352
1912	64,978	152,531	217,509
1913	66,317	119,960	186,277
Total..	199,864	339,243	539,107*

3. **Microscopic Examinations, 1913.** Positive diagnosis of hookworm disease is made mainly by microscopic demonstration of the eggs of the parasite in the stool of the infected person. This method alone is employed by members of the staff. The number of microscopic examinations made, rather than the number of persons treated, affords the best index to the efficiency and progress of the work in a given time in a given territory. In lightly infected areas the difficulties of securing specimens and in making microscopic examinations are much greater than in heavily infected areas.

The total number of persons microscopically examined in eleven states for the year 1913 is 480,951, an increase of 60% over 1912. This means the microscopic examination of more than 1,573 persons for every working day in the year.

State.	Microscopic Examinations 1913
Alabama.....	20,501
Arkansas.....	17,615
Georgia.....	20,000
Kentucky.....	76,514

*See note following table No. 16.

Louisiana.....	26,468
Mississippi.....	72,592
North Carolina.....	107,887
South Carolina.....	45,537
Tennessee.....	24,059
Texas.....	31,537
Virginia.....	38,241
<hr/>	
Total.....	480,951

4. **Microscopic Examinations, 1910-1913.** The total number of persons microscopically examined by the central laboratories and by the field force in eleven states up to December 31, 1913, is 858,377:

State.	Persons Examined 1910-1913.
Alabama.....	27,466
Arkansas.....	18,215
Georgia.....	43,765
Kentucky.....	121,569*
Louisiana.....	39,487
Mississippi.....	115,681
North Carolina.....	288,975
South Carolina.....	60,146
Tennessee.....	34,661
Texas.....	40,831*
Virginia.....	67,581
<hr/>	
Total.....	858,377

5. **Increase of Microscopic Work.** In no feature of the work has the growth been more rapid or more significant than in the number of persons microscopically examined.

*Work begun in 1912.

No. persons microscopically examined:

1910.....	9,481
1911.....	57,943
1912.....	299,825
1913.....	480,951

Total.....858,377*

6. **Cause of Increase in Microscopic Work.**—The most significant factor contributing to this increase in microscopic work is the growing tendency on the part of all classes of people to seek examination regardless of symptoms. This demonstrates that the people have been educated to a considerable extent during the past three years. Though working in lightly infected counties, the response to the opportunity to be examined has been even greater than during the two previous years, when counties were being covered where infection was heavy. In the beginning of the work it was difficult to get people to submit specimens. They were squeamish about it; or only those who were ill, it was thought, needed to be examined. It is coming to be more and more generally recognized that all persons living in or near infected territory are subject to infection; that the infected person, whether he is ill or not, is a danger to himself, to his family, and to the community; that, therefore, every person living in or near infected territory, regardless of symptoms, should be examined.

7. **Average Expenditures for Each Person Examined; and Each Person Treated, 1913.**—The Commission during 1913 expended \$195,900.00 for examining 480,951 persons, and treating 186,277 persons. This means that for every 40c expended by the Commission a person was microscopically

*See note following table No. 13.

examined, and for every \$1.05 a human being has been treated and benefited in health, and helped to a better scale of living.

The two hundred and fourteen counties where dispensary work was completed this year expended \$33,033.92. This means that for every \$.06 spent by the county authorities a person was microscopically examined, and for every \$.17 an infected person was treated and benefited in health.

The various states have expended amounts ranging from about \$200.00 to \$8,000.00. These expenditures, however, have not in all cases been actually recorded; consequently, the cost to the states is here omitted, as calculations should be based on actual recorded expenditures, and not on estimated expenditures.

8. Average Expenditures for Each Person Examined; and Each Person Treated, 1910-1913.—The average cost for each person examined in 1913 was smaller than in previous years, notwithstanding the number of positive specimens examined was less by twelve per cent. than the number examined prior to 1913. Since all agree that the expense for examining negative specimens greatly exceeds that for positive specimens, this showing denotes increased efficiency in the work.

The average cost for each person treated in 1913 exceeds that in 1912. This is due: first, to making the work more scientific, in that no person was treated by the staff during 1913 who was not first found infected by microscopic examination. This was not required in 1912 by many of the field directors who administered treatment on clinical diagnoses. It is due, secondly, to the fact that the work has been conducted in counties having a lighter infection. This means a great increase in the amount of microscopic work required for each person treated.

COST OF EXAMINATIONS, 1910-1913.

Year	Number of Examina- tions made	EXPENDED BY		COST TO	
		Commission	County	Commis- sion	County
1910....	9,481	\$ 66,807 35	.....	\$ 7 04	.....
1911....	57,943	148,407 14	\$ 5,921 03	2 56	\$.12
1912....	299,825	184,671 60	21,351 44	61	.07
1913....	480,951	195,900 00	33,033 92	40	.06
Total...	858,377*	\$595,780 09	\$60,306 39	\$ 69	\$.07

*See note following table No. 13.

COST OF TREATMENTS, 1910-1913.

Year	Number of Treatments Made	EXPENDED BY		COST TO	
		Commission	County	Commis- sion	County
1910....	8,000	\$ 66,807 35	.....	\$ 8 35	.....
1911....	113,352	148,407 14	\$ 5,921 03	1 30	\$.05
1912....	217,509	184,671 60	21,351 44	84	.09
1913....	186,277	195,900 00	33,033 92	1 05	.17
Total...	539,107*	\$595,780 09	\$60,306 39	\$ 1 15	\$.11

*See note following table No. 16.

9. Definite Survey to Determine Degree of Intection.—This survey is based on a microscopic examination of at least 200 children between the ages of 6 and 18, taken at random—that is, without reference to clinical symptoms—from rural districts distributed over the county. This survey has been completed for 413 counties in eleven states. The total number of children examined for the survey in the 413 counties is 415,250, or an average of 1,005 per county.

In number of counties surveyed and in number of children

examined per county, the work of the present year shows a marked advance over that of previous years:

(a) Number of counties surveyed:

1911.....	78
1912.....	131
1913.....	204
Total.....	413

(b) Average number children examined per county:

1911.....	593
1912.....	836
1913.....	1,270

10. Degree of Infection Among Country School Children.—

The degree of infection varies from county to county and from community to community within a county. The records show a percentage of infection by counties ranging from .005 to 96. In the 413 counties in the eleven Southern states, there have been examined to date, 415,250 rural children, of whom 180,374, or 43% were found infected; a reduction of 12% from the 55% infection found among the 156,019 children examined and 85,909 found infected prior to 1913.

This showing is worthy of consideration, because the percentage of infection found among all persons examined in 1913 was smaller than for those examined in previous years. This indicates that the counties where the work of 1913 was done had lighter infection than the counties having the work completed in 1911 and 1912. This lighter infection may have existed four years ago, when this work began; or it may be due in part to the work of the practicing physicians who, during the past four years, have treated and reported 199,864 persons.

Year	Number of Counties Surveyed	Average No. Examined in In County	Number of Children Examined	Number of Children Infected	Per cent. Infected
1910....			210	110	52%
1911....	78	593	46,282	24,289	52%
1912....	131	836	109,527	61,510	56%
1913....	204	1,270	259,231	94,465	36%
Total.	413	1,005	415,250	180,374	43%

Average percentage of infection:

Prior to 1913.....	55%
Prior to 1914.....	43%

11. **Sanitary Survey.**—This survey is an inspection of privy conditions at country homes to determine their degree of efficiency in preventing soil pollution. Its methods are described in our second annual report. The survey has been completed in 501 counties. The number of counties surveyed shows an increase over the records of previous years.

(a) Number counties surveyed:

1911.....	120
1912.....	185
1913.....	196
Total.....	501

(b) Number of homes inspected:

1911.....	47,540
1912.....	61,179
1913.....	80,867
Total.....	189,586

(c) Average number of homes inspected for each county, by years:

1911.....	396
1912.....	330
1913.....	412

Average, all years..... 378

12. Degree of Soil Pollution at Farm Homes.—For the 501 counties surveyed, the records show a sanitary index* for counties ranging from 0 to 34 on a scale of a possible 100. A total of 189,586 farm homes taken at random in 501 counties scattered over eleven states have been inspected; of these 95,988 have no privy. For the 189,586 homes the sanitary index, estimated as for a county, is 5.8%.

No. privies type A at... 100%	412	41,200
No. privies type B at... 75%	550	41,250
No. privies type C at... 50%	692	34,600
No. privies type D at... 25%	4,788	119,700
No. privies type E at... 10%	87,156	871,560
No. privies type F at... 0%	95,988	0

Total number homes inspected.. 189,586 1,108,310
 Sanitary index..... 5.8%

13. The County Dispensary.†—The county dispensary has become the key to the work; with experience its organization has become more definite and its methods of work more effective. Increase of efficiency is exhibited in every item of the dispensary record:

*See Second Annual Report, p. 25.

†For detailed account of the county dispensary and its method of operation see Second Annual Report, pp. 18-22.

- (a) Number of counties making appropriations for dispensaries:

1910.....	2
1911.....	59
1912.....	179
1913.....	217
<hr/>	
Total for four years.....	457

- (b) Total amount appropriated by counties:

1910.....	\$ 241 50
1911.....	9,859 46
1912.....	31,279 25
1913.....	45,595 88
<hr/>	
Total for four years.....	\$86,976 09

- (c) Number counties in which dispensary work has been completed:

1911.....	46
1912.....	159
1913.....	206
<hr/>	
Total for three years.....	411

- (d) Total amount expended by counties in which dispensary work has been completed:

1910.....	
1911.....	\$ 5,921 03
1912.....	21,351 44
1913.....	33,033 92
<hr/>	
Total for four years..	\$60,306 39

(e) Number microscopic examinations made at dispensaries:

1911.....	28,369
1912.....	248,134
1913.....	424,231

Total for three years..... 700,734

(f) Average cost to counties for each microscopic examination made at dispensaries:

1910.....	....
1911.....	\$.12
1912.....	.07
1913.....	.06

Average..... \$.07

(g) Number persons treated at dispensaries:

1911.....	66,752
1912.....	152,531
1913.....	119,960

Total for three years..... 339,243

(h) Average cost to counties for each person treated at dispensaries:

1910.....	....
1911.....	\$.05
1912.....	.09
1913.....	.17

Average.....\$.11

14. Records Made in County Dispensary Work.—The most important feature of the work is the yearly average made along the various lines of activity, and not the individual record for a day, a month, or a county. Yet these individual records are interesting. A few of them will be given in groups of three:

- (a) The largest county appropriation:

<i>Year.</i>	<i>State.</i>	<i>County.</i>	<i>Amount.</i>
1913....	Kentucky.....	Jefferson.....	\$1,000 00
1913....	North Carolina...	Mecklenburg....	500 00
1912....	Louisiana	Vernon.....	330 00

- (b) The largest amount of county funds used:

<i>Year.</i>	<i>State.</i>	<i>County.</i>	<i>Amount.</i>
1913....	Kentucky.....	Jefferson.....	\$1,000 00
1913....	North Carolina...	Mecklenburg....	448 27
1912....	Louisiana.....	Vernon.....	330 00

- (c) The largest number of persons examined the first dispensary day:

<i>Year.</i>	<i>State.</i>	<i>County.</i>	<i>No. Examined.</i>
1912....	North Carolina...	Wake.....	304
1912....	Mississippi.....	Pike.....	287
1913....	Kentucky.....	Harlan.....	238

- (d) The largest number of persons examined any dispensary day:

<i>Year.</i>	<i>State.</i>	<i>County.</i>	<i>No. Examined.</i>
1913....	Kentucky.....	Laurel.....	1,687
1913....	North Carolina...	Union.....	970
1913....	Virginia.....	Lee.....	800

- (e) The largest number of persons examined in any county in a six weeks' campaign:

<i>Year.</i>	<i>State.</i>	<i>County.</i>	<i>No. Examined.</i>
1913....	Kentucky.....	Laurel.....	9,340
1913....	Virginia.....	Lee.....	9,013
1913....	North Carolina...	Union.....	7,937

- (f) The largest percentage of the total population of county examined:

<i>Year.</i>	<i>State.</i>	<i>County.</i>	<i>Per cent. of population examined.</i>
1913....	Kentucky.....	McCreary.....	69%
1913....	North Carolina...	Currituck.....	53%
1911....	Mississippi.....	Pearl River.....	48%

- (g) The largest number of persons treated in any county in a six weeks' campaign:

<i>Year.</i>	<i>State.</i>	<i>County.</i>	<i>Number treated.</i>
1911....	Alabama.....	Coffee.....	3,635
1912....	North Carolina...	Wilkes.....	3,431
1913....	South Carolina...	Greenville.....	2,623

- (h) The highest percentage of infection in a county survey:

<i>Year.</i>	<i>State.</i>	<i>County.</i>	<i>Percentage of infection.</i>
1913....	Georgia.....	Burke.....	96%
1911....	Mississippi.....	Clarke.....	92%
1913....	Texas.....	San Jacinto.....	86%

- (i) The lowest percentage of infection in a county survey:

<i>Year</i>	<i>State.</i>	<i>County.</i>	<i>Percentage of infection.</i>
1913....	Mississippi.....	Claiborne.....	.005
1913....	South Carolina...	Greenwood.....	.037
1913....	Tennessee.....	Obion.....	.09

- (j) The highest sanitary index recorded in a county:

<i>Year.</i>	<i>State.</i>	<i>County.</i>	<i>Sanitary Index.</i>
1913....	Texas.....	Walker.....	34
1912....	Louisiana.....	Tangipahoa.....	19
1913....	Virginia.....	Fairfax.....	15

- (k) The lowest sanitary index recorded in a county:

<i>Year.</i>	<i>State.</i>	<i>County.</i>	<i>Sanitary Index.</i>
1912....	Tennessee.....		.00
1913....	Kentucky.....		.07
1912....	Mississippi.....		.06

- (l) The largest number of homes included in any county sanitary survey:

<i>Year.</i>	<i>State.</i>	<i>County.</i>	<i>Number of Homes.</i>
1913....	Kentucky.....	Clarke.....	2,078
1912....	Mississippi.....	Lauderdale.....	1,431
1911....	Louisiana.....	Acadia.....	1,335

- (m) The oldest person found infected:

<i>State.</i>	<i>Name.</i>	<i>County.</i>	<i>Age.</i>
South Carolina.....		Lancaster.....	94 years.
Alabama.....		Lauderdale.....	91 years.
North Carolina... Annis Stokes...		Yadkin.....	91 years.

(n) The youngest person found infected:

<i>State.</i>	<i>Name.</i>	<i>County.</i>	<i>Age.</i>
Alabama.....	Houston.....		three mos.
Mississippi.....	W. H. Belmont.	Tishomingo....	ten mos.
Georgia.....	Tom Watson...	Macon.....	12 mos.

(o) The largest number of persons found infected in one family:

<i>State.</i>	<i>Name.</i>	<i>County.</i>	<i>Number infected in family.</i>
Mississippi.....	Rogers.....	Lawrence.....	17
North Carolina...	Lawson.....	Stokes.....	16
Tennessee.....	McMinn.....		14

TABLE 1.—*Infection Survey, 1913.*

State	Number of Surveys Made*	Number Children Examined	Number Infected	Per cent. Infected
Alabama.....	12	12,302	5,997	48.7
Arkansas.....	11	7,541	1,681	22.2
Georgia.....	15	6,083	4,844	79.6
Kentucky.....	18	82,141	26,371	32.1
Louisiana.....	19	24,771	12,056	48.9
Mississippi.....	27	40,028	13,356	33.3
North Carolina.....	36	38,820	13,434	34.5
South Carolina.....	17	14,399	6,118	42.4
Tennessee.....	13	8,290	3,733	45.0
Texas.....	20	13,976	5,756	41.2
Virginia.....	21	15,028	3,893	25.9
Total.....	209	263,379	97,239	36.9

TABLE 2.—*Infection Survey, No. of Counties Surveyed by Years.*

State	No. of Counties	1910	1911	1912	1913 (by quarters)					Grand Total
					1	2	3	4	Total	
Alabama.....	67	....	4	10	3	3	3	3	12	26
Arkansas.....	75	....	6	7	2	2	1	6	11	24
Georgia.....	148	....	2	14	3	4	3	5	15	31
Kentucky.....	120	....	....	3	1	9	4	4	18	21
Louisiana.....	64	....	10	11	4	5	4	6	19	40
Mississippi.....	79	....	9	23	6	4	8	7	25	57
North Carolina.....	100	....	23	32	10	7	9	8	34	89
South Carolina.....	44	....	3	8	5	5	3	4	17	28
Tennessee.....	96	....	11	11	..	4	4	4	12	34
Texas.....	249	....	....	4	3	6	6	5	20	24
Virginia.....	100	....	10	8	..	10	6	5	21	39
Total.....	1,142	....	78	131	37	59	51	57	204	413

*Five second surveys included.

GENERAL SUMMARY WITH NOTES

TABLE 3.—*Infection Survey.*
NUMBER OF CHILDREN EXAMINED AND NUMBER INFECTED, BY YEARS.

State	1910	1911	1912	1913 (by quarters)					Grand Total
				1	2	3	4	Total	
Alabama.....		1,493 1,084	3,007 1,721	1,334 944	2,964 1,969	3,138 1,051	4,866 2,053	12,302 5,997	16,802 8,752
Arkansas.....		4,435 3,108	5,702 1,875	1,072 485	1,331 474	1,427 439	3,711 283	7,541 1,081	17,678 6,664
Georgia.....		568 451	6,406 4,998	1,549 1,297	1,389 1,298	1,511 1,153	1,634 1,096	6,083 4,844	13,057 10,263
Kentucky.....		---	5,974 3,001	4,499 24	41,680 13,967	22,269 6,389	13,693 5,991	82,141 26,571	88,115 29,372
Louisiana.....		4,541 1,669	8,442 4,008	3,891 1,827	5,191 2,228	7,138 3,826	8,551 4,175	24,771 12,056	37,754 17,783
Mississippi.....		4,152 3,460	22,060 16,566	8,039 4,710	6,214 1,243	12,871 4,453	9,764 460	36,888 10,866	63,100 30,892
North Carolina.....	210 110	23,184 11,076	40,667 20,540	12,094 3,864	8,803 3,597	8,901 2,140	8,453 3,737	38,251 13,338	102,312 45,064
South Carolina.....		1,183 918	3,348 1,612	4,888 1,468	2,910 1,164	3,818 2,232	2,783 1,284	14,399 6,118	18,985 8,648
Tennessee.....		2,671 1,124	3,624 1,527	---	2,593 1,076	2,207 783	3,051 1,686	7,871 3,545	14,146 6,196
Texas.....		---	4,216 2,879	2,791 1,351	4,370 2,736	2,496 762	4,319 907	13,976 5,756	18,102 8,635
Virginia.....		4,050 1,449	6,081 2,783	---	6,670 1,574	5,315 1,647	3,043 672	15,028 3,863	25,159 8,125
Total.....	210 110	46,282 24,289	109,527 61,510	40,157 15,970	84,115 31,326	71,091 24,875	63,868 22,294	259,231 94,465	415,250 180,374

TABLE 4.
COMPARATIVE DEGREE OF INFECTION BETWEEN PERSONS OF ALL AGES, AND THOSE OF SCHOOL AGE.

State	ALL AGES			SCHOOL AGE		
	Examined	Infected	P. C. Infection	Examined	Infected	P. C. Infection
Alabama.....	25,821	11,204	43%	16,802	8,752	52%
Arkansas.....	17,169	4,151	24%	17,678	6,664	37%
Georgia.....	31,251	19,034	60%	13,057	10,293	78%
Kentucky.....	64,485	22,862	35%	88,115	29,372	33%
Louisiana.....	35,472	17,533	49%	37,754	17,733	46%
Mississippi.....	110,007	42,722	38%	63,100	30,892	48%
North Carolina.....	247,870	77,625	31%	102,312	45,064	44%
South Carolina.....	47,692	16,386	34%	18,935	8,648	45%
Tennessee.....	32,432	10,369	31%	14,146	6,196	43%
Texas.....	38,913	13,447	34%	18,192	8,635	47%
Virginia.....	49,622	12,888	25%	25,159	8,125	32%
Total.....	700,734	248,221	35%	415,250	180,374	43%

TABLE 5.—*Sanitary Survey, 1913.*

State	Number of Surveys Made*	Number of Rural Homes Inspected
Alabama.....	11	2,253
Arkansas.....	10	5,110
Georgia.....	21	5,507
Kentucky.....	18	13,048
Louisiana.....	19	6,813
Mississippi.....	32	20,805
North Carolina.....	33	10,893
South Carolina.....	16	3,888
Tennessee.....	19	4,930
Texas.....	20	7,925
Virginia.....	5	1,029
Total.....	204	82,201

TABLE 6.—*Sanitary Survey—Number of Counties Surveyed by Years.*

State	No. of Counties in State	1910	1911	1912	1913 (by quarters)					Grand Total
					1	2	3	4	Total	
Alabama.....	67	....	9	15	3	3	2	3	11	35
Arkansas.....	75	....	11	10	2	2	2	4	10	31
Georgia.....	148	....	10	14	6	4	5	4	19	43
Kentucky.....	120	....	....	8	..	9	3	6	18	26
Louisiana.....	64	....	10	11	4	7	3	5	19	40
Mississippi.....	79	....	5	24	4	8	5	13	30	59
North Carolina...	100	....	43	20	10	8	7	8	33	96
South Carolina...	44	....	4	22	..	8	2	3	13	39
Tennessee.....	96	....	14	9	1	6	5	6	18	41
Texas.....	249	....	....	4	3	6	6	5	20	24
Virginia.....	100	....	14	48	4	1	..	..	5	67
Total.....	1,142	....	120	185	37	62	40	57	196	501

*Eight second surveys included.

TABLE NO. 7—*Sanitary Survey.*
NUMBER OF RURAL HOMES INSPECTED BY YEARS.

State	1910	1911	1912	1913 (by quarters)				Grand Total
				1	2	3	4	
Alabama.....	2,536	3,651	558	689	452	524	2,253
Arkansas.....	8,808	4,291	850	909	1,306	2,045	5,110
Georgia.....	3,933	4,623	1,329	955	1,478	1,130	4,892
Kentucky.....	3,372	.....	6,355	1,142	6,184	13,681
Louisiana.....	6,321	8,258	1,249	2,139	1,445	1,980	6,813
Mississippi.....	1,304	11,178	4,521	4,420	3,437	7,921	20,299
North Carolina.....	17,542	7,356	3,092	2,576	2,152	3,073	10,893
South Carolina.....	1,533	5,352	320	1,682	706	544	3,252
Tennessee.....	2,898	1,904	200	1,401	1,967	1,152	4,720
Texas.....	1,383	751	2,372	2,394	2,408	7,925
Virginia.....	2,665	9,811	826	203	.....	.....	1,029
Total.....	47,540	61,179	13,726	23,701	16,479	26,961	80,867
								189,586

TABLE 8.—*Sanitary Survey.*
TOTAL NUMBER OF HOMES INSPECTED WITH CLASSIFICATION OF PRIVIES FOUND, ALL YEARS.

State	CLASS OF PRIVIES						Grand Total
	A	B	C	D	E	F	
Alabama.....	52	.....	.....	73	4,676	3,639	8,440
Arkansas.....	.....	.....	.....	.....	6,806	11,403	18,209
Georgia.....	.....	7	.....	21	9,570	3,850	13,448
Kentucky.....	50	47	117	1,477	6,532	8,830	17,053
Louisiana.....	4	165	132	1,030	12,282	7,779	21,392
Mississippi.....	4	3	100	113	13,113	19,448	32,781
North Carolina.....	17	2	12	221	16,253	19,286	35,791
South Carolina.....	86	1	2	10	4,656	5,382	10,137
Tennessee.....	10	19	5	218	2,857	6,413	9,522
Texas.....	136	292	324	942	2,961	4,653	9,308
Virginia.....	53	14	.....	683	7,450	5,305	13,505
Total.....	412	550	692	4,788	87,156	95,988	189,586

TABLE 9.—*Dispensary Summary.*
NUMBER OF COUNTIES APPROPRIATING BY YEARS.

States	No. of Counties in State	1910	1911	1912	1913 (by quarters)					Grand Total
					1	2	3	4	Total	
Alabama.....	67	1	10	15	5	2	3	5	15	41
Arkansas.....	75	....	1	3	..	5	5	10	20	24
Georgia.....	148	....	2	21*	5	5	7	3	20	43
Kentucky.....	120	....	....	7	2	8	4	1	15	22
Louisiana.....	64	....	8	10	1	6	8	4	19	37
Mississippi.....	79	1	9	27	5	9	8	4	26	63
North Carolina...	100	....	17	41	11	14	15	0	40	98
South Carolina...	44	....	3	19	6	5	5	0	16	38
Tennessee.....	96	....	6	9	3	3	3	6	15	30
Texas.....	249	....	....	14	2	8	4	7	21	35
Virginia.....	100	....	3	13	..	3	7	..	10	26
Total.....	1,142	2	59	179	40	68	69	40	217	457

TABLE 10.—*Dispensary Summary.*
NUMBER OF COUNTIES HAVING DISPENSARY WORK COMPLETED BY YEARS.

States	No. of Counties in State	1910	1911	1912	1913 (by quarters)					Grand Total
					1	2	3	4	Total	
Alabama.....	67	....	9	16	3	2	4	3	12	37
Arkansas.....	75	....	1	4	..	3	4	5	12	17
Georgia.....	148	....	1	18	5	6	3	7	21	40
Kentucky.....	120	....	....	6	0	3	8	1	12	18
Louisiana.....	64	....	5	10	5	4	6	5	20	35
Mississippi.....	79	....	8	23	6	5	7	8	26	57
North Carolina...	100	....	15	38	10	8	14	7	39	92
South Carolina...	44	....	4	20	4	6	3	3	16	40
Tennessee.....	96	....	....	12	2	5	4	4	15	27
Texas.....	249	....	....	4	3	6	6	5	20	24
Virginia.....	100	....	3	8	0	3	7	3	13	24
Total.....	1,142	....	46	159	38	51	66	51	206	411

TABLE 11.—*Dispensary Summary*
 NUMBER OF PERSONS MICROSCOPICALLY EXAMINED, AT DISPENSARIES, BY YEARS.

State	1910	1911	1912	Prior to 1913	1913 (by quarters)				Grand Total
					1	2	3	4	
Alabama.....	1,784	4,267	6,051	1,772	4,147	5,829	8,022	19,770
Arkansas.....	3,200	7,627	6,342	17,169
Georgia.....	531	14,509	15,040	3,611	4,488	3,399	4,713	31,251
Kentucky.....	14,049	14,049	.....	14,609	33,408	2,419	50,436
Louisiana.....	2,862	8,004	10,866	4,641	4,595	7,569	7,801	24,606
Mississippi.....	3,288	36,732	40,020	18,287	8,827	23,800	19,073	69,987
North Carolina.....	16,701	126,562	143,263	28,964	26,011	34,192	15,440	104,607
South Carolina.....	2,130	8,124	10,254	8,323	8,951	9,935	10,229	37,438
Tennessee.....	9,098	9,098	1,167	5,701	7,540	8,926	23,334
Texas.....	8,460	8,460	6,915	9,867	6,374	7,297	30,453
Virginia.....	1,073	18,329	19,402	.....	5,695	20,452	4,073	30,220
Total.....	28,369	248,134	276,503	73,680	96,091	160,125	94,335	424,231
									700,734

TABLE 12.—*Dispensary Summary*
NUMBER OF PERSONS MICROSCOPICALLY EXAMINED AT CENTRAL LABORATORY, BY YEARS.

State	1910	1911	1912	Prior to 1913	1913 (by quarters)				Total	Grand Total
					1	2	3	4		
Alabama.....	92	183	639	914	161	239	183	148	731	1,645
Arkansas.....				600	134	116	103	93	446	1,046
Georgia.....	1,440	4,300	2,985	8,725	1,121	820	869	979	3,789	12,514
Kentucky.....			31,006	31,006	8,205	8,759	6,367	2,747	26,078	57,084
Louisiana.....				2,153	1,030	588	96	148	1,862	4,015
Mississippi.....				3,069	1,200	398	507	500	2,605	5,674
North Carolina...	7,949	20,115	9,761	37,825	2,024	467	370	419	3,280	41,105
South Carolina.....				4,355	1,761	1,947	2,690	1,701	8,099	12,454
Tennessee.....		607	897	1,504	229	153	189	154	725	2,229
Texas.....			834	834	600	139	39	306	1,084	1,918
Virginia.....		4,369	5,569	9,938	4,080	2,432	744	765	8,021	17,959
Total.....	9,481	29,574	51,691	100,923*	20,545	16,058	12,157	7,960	56,720	157,643

*See note following table No. 13.

TABLE 13.—*Dispensary Summary*
TOTAL NUMBER PERSONS MICROSCOPICALLY EXAMINED, BY YEARS.

State	1910	1911	1912	Prior to 1913	1913 (by quarters)				Total	Grand Total
					1	2	3	4		
Alabama.....	92	1,967	4,906	6,965	1,933	4,386	6,012	8,170	20,501	27,466
Arkansas.....				600	134	3,316	7,730	6,435	17,615	18,215
Georgia.....	1,440	4,831	17,494	23,765	4,732	5,308	4,268	5,692	20,000	43,765
Kentucky.....			45,055	45,055	8,205	23,368	39,775	5,166	76,514	121,569
Louisiana.....			8,004	13,019	5,671	5,183	7,665	7,949	26,468	39,487
Mississippi.....		3,288	36,732	43,089	19,487	9,225	24,307	19,573	72,592	115,681
North Carolina...	7,949	36,816	136,323	181,088	30,988	26,478	34,562	15,859	107,887	288,975
South Carolina...		2,130	8,124	14,609	10,084	10,898	12,625	11,930	45,537	60,146
Tennessee.....		607	9,995	10,602	1,396	5,854	7,729	9,080	24,059	34,661
Texas.....			9,294	9,294	7,515	10,006	6,413	7,603	31,537	40,831
Virginia.....			23,898	29,340	4,080	8,127	21,196	4,838	38,241	67,581
Total.....	9,481	57,943	299,825	377,426*	94,225	112,149	172,282	102,295	480,951	858,377

*In the column headed "Prior to 1913" there are included 600 examinations for Arkansas, 2,153 Louisiana, 3,069 for Mississippi and 4,355 for South Carolina that cannot be itemized by years, because of a lack of uniformity in the early State records. The column "Prior to 1913" is consequently 10,177 examinations in excess of the total examinations reported for 1910, 1911 and 1912.

TABLE 14.—*Dispensary Summary*
NUMBER OF PERSONS TREATED AT DISPENSARIES, BY YEARS.

State	1910	1911	1912	Prior to 1913	1913 (by quarters)				Grand Total
					1	2	3	4	
Alabama.....	15,206	9,116	24,322	730	2,990	1,547	2,810	8,077
Arkansas.....	287	1,734	2,021	.....	791	2,263	340	3,394
Georgia.....	587	10,341	10,928	2,608	2,959	2,074	2,365	10,006
Kentucky.....	6,353	6,353	.....	1,563	10,492	1,436	13,491
Louisiana.....	6,322	11,965	18,287	2,141	2,184	3,662	3,860	11,847
Mississippi.....	14,099	33,492	47,591	7,283	1,580	5,500	3,285	17,648
North Carolina.....	27,219	41,702	68,921	6,063	6,443	6,081	3,350	21,937
South Carolina.....	2,437	21,154	23,591	1,851	2,285	3,939	2,991	11,066
Tennessee.....	6,720	6,720	318	1,501	1,736	3,350	6,905
Texas.....	4,298	4,298	2,169	4,444	1,145	1,274	9,032
Virginia.....	595	5,656	6,251	.....	959	4,992	606	6,557
Total.....	66,752	152,531	219,283	23,163	27,699	43,431	25,667	119,960
									339,243

TABLE 15.—*Dispensary Summary*
NUMBER OF PERSONS TREATED BY PHYSICIANS, BY YEARS.

State	1910	1911	1912	Prior to 1913	1913 (by quarters)					Grand Total
					1	2	3	4	Total	
Alabama.....				4,516	711	801	226	1,887	3,625	8,141
Arkansas.....				1,923				1,500	1,500	3,423
Georgia.....		7,228	6,887	14,115				5,733	5,733	19,848
Kentucky.....			15,750	15,750		21,033		8,687	29,720	45,470
Louisiana.....				7,530	1,157	1,148	1,050	1,656	5,011	12,541
Mississippi.....		15,803	10,201	26,004				5,614	5,614	31,618
North Carolina...	8,000	16,709	15,859	40,568	3,784	3,232	2,932	1,955	11,903	52,471
South Carolina...		1,774	10,840	12,614						12,614
Tennessee.....		666	584	1,250	67	66	34	95	262	1,512
Texas.....			3,230	3,230	466	235	174	810	1,685	4,915
Virginia.....		4,420	1,627	6,047				1,264	1,264	7,311
Totals.....	8,000	46,600	64,978	133,547*	6,185	26,515	4,416	29,201	66,317	199,864

*See note following table No. 16.

TABLE 16.—*Dispensary Summary*
TOTAL NUMBER OF PERSONS TREATED, BY YEARS.

State	1910	1911	1912	Prior to 1913	1913 (by quarters)				Total	Grand Total
					1	2	3	4		
Alabama.....		15,206	9,116	28,838	1,441	3,791	1,773	4,697	11,702	40,540
Arkansas.....		287	1,734	3,944	.....	791	2,263	1,840	4,894	8,838
Georgia.....		7,815	17,228	25,043	2,608	2,959	2,074	8,098	15,739	40,782
Kentucky.....		.....	22,103	22,103	.....	22,596	10,492	10,123	43,211	65,314
Louisiana.....		6,322	11,965	25,817	.....	3,332	4,712	5,516	16,858	42,675
Mississippi.....		29,902	43,693	73,595	7,283	1,580	5,500	8,899	23,262	96,857
North Carolina...	8,000	43,928	57,561	109,489	9,847	9,675	9,013	5,305	33,840	143,329
South Carolina...		4,211	31,994	36,205	1,851	2,285	3,939	2,991	11,066	47,271
Tennessee.....		666	7,304	7,970	385	1,567	1,770	3,445	7,167	15,137
Texas.....		.....	7,528	7,528	2,635	4,679	1,319	2,084	10,717	18,245
Virginia.....		5,015	7,283	12,298	.....	959	4,992	1,870	7,821	20,119
Total.....	8,000	113,352	217,509	352,830*	29,348	54,214	47,847	54,868	186,277	539,107

* In the column headed "Prior to 1913" there are included 4,516 persons treated for Alabama, 1,923 for Arkansas, 7,530 for Louisiana, that could not be itemised by years because of a lack of uniformity in the early State records. The column "Prior to 1913" is, consequently, 13,969 in excess of the total number of persons reported as treated for 1910, 1911 and 1912.

TABLE 17.—*Dispensary Summary,*
TREATMENTS, 1913

State	NUMBER OF PERSONS AND TIMES TREATED						Total No. of Persons Treated	Total No. of Treatments
	One	Two	Three	Four	Five	Six		
Alabama.....	8,077	2,562	559	163	20	.....	8,077	11,381
Arkansas.....	3,394	567	31	1	.....	.....	3,394	3,993
Georgia.....	10,006	2,047	544	127	33	9	10,006	12,766
Kentucky.....	13,491	138	.....	.....	.....	.....	13,491	13,629
Louisiana.....	11,847	3,895	726	12	.....	.....	11,847	16,480
Mississippi.....	17,648	16,495	14,014	19	6	.....	17,648	48,182
North Carolina.....	21,937	17,290	13,826	793	159	54	21,937	54,059
South Carolina.....	11,066	8,691	7,527	6,637	904	448	11,066	35,273
Tennessee.....	6,905	5,326	2,718	132	20	5	6,905	15,106
Texas.....	9,032	1,807	364	28	.....	.....	9,032	11,231
Virginia.....	6,557	6,550	6,534	.....	.....	.....	6,557	19,641
Total.....	119,960	65,368	46,843	7,912	1,142	.....	119,960	241,741

TABLE 18.—*Enlisting the Physicians, 1913.**

State	Number Physicians in State	Number Visits to Physicians	Number Lectures to Physicians	Number Letters to Physicians	Number Bulletins to Physicians	Cases Reported Treated by Physicians
Alabama.....	2,350	305	10	287	.....	8,141
Arkansas.....	3,600	462	55	.....	7,022	3,423
Georgia.....	3,120	140	18	3,340	9,183	19,848
Kentucky.....	3,340	5,227	.....	16,610	32,139	45,470
Louisiana.....	2,039	265	6	7,850	5,275	12,541
Mississippi.....	1,783	677	3	815	1,042	31,618
North Carolina.....	1,847	384	4	5,674	32,309	52,471
South Carolina.....	1,303	381	8	150	12,339	12,614
Tennessee.....	3,400	975	12	1,408	1,073	1,512
Texas.....	5,126	607	8	11,661	1,108	4,915
Virginia.....	2,357	491	9	6,900	4,600	7,311
Total.....	30,265	9,914	133	54,695	106,090	199,864

*This table includes only the work of the field directors; not that of the central office.

TABLE 19.—*Putting a Stop to Soil Pollution.*
EDUCATING THE PEOPLE.

State	THROUGH THE SCHOOLS				Through Public Lectures	
	Number of Teachers in State	TEACHERS REACHED			No. Lectures Given	Est. No. Attending
		By Visit	By Letter	By Bulletin or Leaflet		
Alabama.....	9,220	471	287	.....	335	33,460
Arkansas.....	10,175	2,199	.....	.....	507	50,139
Georgia.....	8,714	129	75	340	711	36,663
Kentucky.....	9,487	384	.....	122	1,698	250,151
Louisiana.....	6,403	360	1,293	1,593	566	58,919
Mississippi.....	10,166	1,646	2,615	1,186	1,452	108,062
North Carolina.....	8,422	214	1,250	4,503	75	7,131
South Carolina.....	4,255	22	1,470	45,520	168	17,350
Tennessee.....	9,233	483	157	1,068	100	10,709
Texas.....	21,277	300	1,491	1,491	566	46,596
Virginia.....	9,000	405	450	.....	620	52,015
Total.....	106,352	6,613	9,088	55,823	6,798	671,195

TABLE 20.—*Putting a Stop to Soil Pollution.**
EDUCATING THE PEOPLE.

State	Through Bulletins	Through the Press			
	Number of Bulletins and Leaflets	Number of Papers in State	Personally Visited	Letters to Press	Articles Furnished
Alabama.....	94,611	235	25	2	140
Arkansas.....	.....	290	139	.....	207
Georgia.....	26,605	311	33	.....	6
Kentucky.....	67,060	289	411	38	365
Louisiana.....	80,614	198	53	64	79
Mississippi.....	100,294	234	146	68	275
North Carolina.....	192,423	255	120	1,474	208
South Carolina.....	82,100	156	66	31	161
Tennessee.....	44,742	252	79	61	78
Texas.....	128,687	933	97	69	191
Virginia.....	67,000	211	38	.....	110
Total.....	884,136	3,364	1,207	1,807	1,820

*This table includes only the work of the field directors; not that of the central office.

TABLE 21.

COUNTY APPROPRIATIONS (BY YEARS).

State	1910	1911	1912	1913 (by quarters)				Total	Grand Total
				1	2	3	4		
Alabama.....	\$ 60 00	\$ 1,560 00	\$ 1,925 00	\$ 741 00	\$ 200 00	\$ 400 00	\$ 925 00	\$ 2,266 00	\$ 5,811 00
Arkansas.....	-----	50 00	200 00	-----	620 62	900 00	2,150 00	3,670 62	3,920 62
Georgia.....	-----	300 00	2,950 00	750 00	800 00	842 50	450 00	2,842 50	6,092 50
Kentucky.....	-----	-----	1,950 00	550 00	2,600 00	1,100 00	400 00	4,650 00	6,600 00
Louisiana.....	-----	1,077 50	1,563 00	300 00	1,025 00	1,171 00	850 00	3,346 00	5,986 50
Mississippi.....	181 50	1,672 48	4,938 99	1,090 00	1,864 92	1,900 00	900 00	5,754 92	12,547 89
North Carolina.....	-----	4,246 28	10,161 59	3,350 16	4,219 03	3,400 00	-----	10,969 19	25,379 06
South Carolina.....	-----	101 20	990 67	575 00	500 00	750 00	850 00	2,675 00	3,766 87
Tennessee.....	-----	450 00	1,200 00	221 65	450 00	400 00	900 00	1,971 65	3,621 65
Texas.....	-----	-----	4,200 00	600 00	2,400 00	1,200 00	2,100 00	6,300 00	10,500 00
Virginia.....	-----	400 00	1,200 00	-----	300 00	850 00	-----	1,150 00	2,750 00
Total.....	\$ 241 50	\$ 9,859 46	\$ 31,279 25	\$ 8,177 81	\$ 14,979 57	\$ 12,913 50	\$ 9,525 00	\$ 45,595 88	\$ 86,376 09

GENERAL SUMMARY WITH NOTES

TABLE 22.
COUNTY EXPENDITURES (BY YEARS).

State	1910	1911	1912	1913 (by quarters)				Grand Total
				1	2	3	4	
Alabama.....	-----	\$ 1,086 60	\$ 974 90	\$ 167 57	\$ 352 63	\$ 274 50	\$ 379 70	\$ 3,235 90
Arkansas.....	-----	50 00	64 22	-----	213 41	488 63	758 77	1,575 03
Georgia.....	-----	89 25	1,885 58	552 78	769 50	385 42	785 68	4,468 21
Kentucky.....	-----	-----	1,750 00	-----	1,150 00	2,500 00	100 00	5,500 00
Louisiana.....	-----	502 50	1,613 00	710 00	416 40	819 30	892 00	4,953 20
Mississippi.....	-----	561 47	4,025 46	1,228 48	918 59	1,459 97	1,401 11	9,595 08
North Carolina.....	-----	3,431 86	8,161 36	1,889 39	2,017 25	2,480 00	1,169 92	19,149 78
South Carolina.....	-----	47 05	600 87	160 00	143 10	210 25	255 18	1,416 45
Tennessee.....	-----	-----	716 03	246 33	219 63	446 19	587 59	2,215 82
Texas.....	-----	-----	1,039 97	855 10	1,685 35	1,471 50	1,272 70	6,344 62
Virginia.....	-----	152 30	500 00	-----	200 00	700 00	300 00	1,852 30
Total.....	-----	\$ 5,921 03	\$ 21,351 44	\$ 5,809 65	\$ 8,085 86	\$ 11,235 76	\$ 7,902 65	\$ 60,306 39
								\$ 33,033 92

TABLE 23.
EXPENDITURES OF COMMISSION (BY YEARS).

State	1910	1911	1912	1913 (by quarters)				Grand Total
				1	2	3	4	
Alabama.....	\$ 1,444 32	\$ 10,401 98	\$ 12,135 78	\$ 3,437 27	\$ 3,605 21	\$ 3,570 51	\$ 3,883 89	\$ 14,536 88
Arkansas.....	4,474 20	13,376 06	13,243 41	3,245 35	3,404 32	3,633 46	3,725 16	14,008 29
Georgia.....	6,933 86	17,011 03	15,726 44	4,383 58	4,113 45	4,009 23	4,077 88	16,584 14
Kentucky.....	-----	-----	14,823 41	4,794 66	5,859 08	4,904 65	4,629 64	19,888 03
Louisiana.....	549 99	10,497 60	14,260 40	4,133 44	3,659 84	3,812 86	3,828 82	15,434 96
Mississippi.....	6,283 11	17,504 08	19,611 34	5,211 45	4,840 03	5,369 24	4,927 57	20,348 29
North Carolina.....	9,948 76	18,621 06	19,153 84	4,489 65	5,067 93	3,833 49	3,406 63	16,797 70
South Carolina.....	4,029 91	12,133 92	14,086 83	3,233 33	4,054 55	3,953 75	4,076 61	15,318 24
Tennessee.....	5,002 20	15,330 91	16,514 06	3,810 78	3,860 31	4,007 68	3,386 88	15,065 65
Texas.....	-----	-----	4,117 96	3,103 35	3,298 58	3,062 35	3,304 15	12,768 43
Virginia.....	8,353 09	14,778 43	13,637 16	3,332 92	3,803 05	3,949 14	3,436 11	14,421 22
Total.....	\$ 47,019 44	\$ 129,655 07	\$ 157,310 63	\$ 43,175 78	\$ 45,656 35	\$ 43,706 36	\$ 42,683 24	\$ 175,291 83
Administrative Expenses.....	19,787 91	18,762 07	27,360 97	4,992 04	5,173 98	4,440 56	5,571 59	20,678 17
Grand total.....	\$ 66,807 35	\$ 148,407 14	\$ 184,671 60	\$ 48,167 82	\$ 51,330 33	\$ 48,146 92	\$ 48,254 93	\$ 195,900 00
								\$ 595,780 09

CHAPTER II.

SUMMARY OF ACTIVITIES AND RESULTS BY STATES.*

ALABAMA.

I. INFECTION SURVEY.

Infection survey, based on an examination of at least 200 children between the ages of 6 and 18 years, taken at random from the country.

County	Surveyed by	Number Examined	Number Infected	Per cent. of Infection
Autauga.....	Dr. Orr.....	430	228	53.0
Baldwin.....	Dr. Perdue.....	632	454	71.8
Chambers.....	Dr. Orr.....	380	54	14.2
Chilton.....	Dr. Grote.....	982	694	70.6
Clarke.....	Dr. Perdue.....	473	367	77.5
Hale.....	Dr. Caldwell.....	761	468	61.5
Lamar.....	Dr. Grote.....	431	349	80.9
Marengo.....	Drs. Caldwell and Grote....	1,034	606	58.6
Mobile.....	Drs. Grote and Caldwell....	1,360	708	52.0
Tuscaloosa.....	Dr. Orr.....	2,745	857	31.2
Walker.....	Drs. Grote and Orr.....	1,724	391	22.6
Washington....	Dr. Caldwell....	1,350	821	60.8
		12,302	5,997	48.7

II. SANITARY SURVEY.

Sanitary survey, based on an inspection of privy conditions at at least 100 country homes.

Doctor and County	TYPE OF PRIVY							Sanitary Index
	A	B	C	D	E	F	Total	
Dr. Orr—Autauga.....	---	---	---	14	30	97	141	4.61
Dr. Perdue—Baldwin.....	---	---	---	---	179	29	208	8.60
Dr. Orr—Chambers.....	---	---	---	---	56	189	245	2.28
Dr. Grote—Chilton.....	---	---	---	---	149	96	245	6.08
Dr. Caldwell—Hale.....	---	---	---	---	90	59	149	6.04
Dr. Grote—Lamar.....	---	---	---	---	50	173	223	2.24
Drs. Caldwell and Grote—Marengo.....	---	---	---	---	143	93	236	6.05
Drs. Grote and Caldwell—Mobile.....	1	---	---	---	155	42	198	7.82
Dr. Orr—Tuscaloosa.....	---	---	---	---	29	148	177	1.65
Dr. Grote—Walker.....	---	---	---	---	52	155	207	2.51
Dr. Caldwell—Washington.....	---	---	---	---	121	103	224	5.40
Total.....	1	---	---	14	1,054	1,184	2,253	---

*All summaries will be found in the tables in chapter I.

III. WORK OF COUNTY DISPENSARIES.

Doctor and County	Amount of County Appropriation	Amount Expended	Number Microscopic Examinations			NUMBER PERSONS AND TIMES TREATED						Total Treatments
			Pos.	Neg.	Total	One	Two	Three	Four	Five	Six	
Dr. Orr—Autauga.....	\$ 150 00	\$ 65 00	255	274	529	228	76	20	5	—	—	324
Dr. Perdue—Baldwin.....	150 00	50 00	465	199	664	642	200	39	—	—	—	886
Dr. Orr—Chambers.....	50 00	29 00	70	583	653	68	40	2	—	—	—	110
Dr. Grote—Chilton.....	150 00	111 63	972	873	1,845	1,059	514	102	53	5	—	1,733
Dr. Perdue—Clarke.....	100 00	50 35	369	106	475	503	198	74	30	—	—	805
Dr. Caldwell—Hale.....	150 00	95 00	654	566	1,220	692	126	36	21	2	—	877
Dr. Grote—Lamar.....	100 00	52 22	495	273	768	502	180	40	7	2	—	731
Dr. Caldwell—Marengo.....	150 00	133 50	898	1,145	2,043	891	193	51	19	8	—	1,162
Drs. Grote and Caldwell—Mobile.....	150 00	109 70	949	1,242	2,191	998	388	67	11	—	—	1,464
Dr. Orr—Tuscaloosa.....	175 00	175 00	1,112	3,499	4,611	1,120	284	49	5	—	—	1,458
Dr. Grote & Orr—Walker.....	200 00	112 00	585	2,548	3,133	588	172	25	1	—	—	786
Dr. Caldwell—Washington.....	191 00	191 00	924	714	1,638	786	191	54	11	3	—	1,045
Total.....	\$1,716 00	\$1,174 40	7,748	12,022	19,770	8,077	2,562	559	163	20	—	11,381

IV. WORK OF LABORATORY.

	Total During 1913
Number specimens examined.....	731
Number specimens showing hookworm infection.....	223
Number specimens showing Ascaris.....	8
Number specimens showing Hymenolepis.....	[11
Number specimens showing Trichocephalus.....	1
Number specimens showing Oxyuris.....	5
Number specimens showing Tenia Saginata.....	18
Number specimens showing infection.....	266
Number specimens negative.....	465

V. WORK OF GENERAL PRACTITIONERS OF MEDICINE.

(Number of Physicians in State, 2,500)	
Number of physicians personally visited.....	305
Number of lectures to physicians.....	10
Number of circulars or bulletins to physicians.....	-----
Number of letters or post cards to physicians.....	287
Number physicians reporting treating Uncinariasis.....	130
Number of persons reported treated by physicians.....	3,625

VI. EDUCATING THE PEOPLE IN SANITATION.
(By Field Directors).

1. By Public Lectures:	
Number public lectures delivered.....	335
Estimated number attending.....	33,460
2. Through the Schools:	
Number teachers visited.....	471
Number letters to teachers.....	287
Number pamphlets and bulletins to teachers.....	-----
3. Bulletins, Leaflets and Other Literature:	
Number bulletins and leaflets distributed.....	94,611
Number sanitary-privy leaflets distributed.....	•
Number other literature distributed.....	•
4. Through the Press:	
Number papers personally visited.....	25
Number letters to editors.....	2
Number articles furnished for publication.....	140

ARKANSAS.

I. INFECTION SURVEY.

Infection survey, based on an examination of at least 200 children between the ages of 6 and 18 years, taken at random from the country.

County	Surveyed by	Number Examined	Number Infected	Per cent. of Infection
Clark.....	Dr. Campbell...	590	101	17.1
Conway.....	Dr. Campbell...	612	7	1.1
Faulkner.....	Dr. Jacocks.....	1,289	27	2.1
Independence..	Dr. Fly.....	336	64	19.0
Lee.....	Dr. Bradford....	603	124	20.56
Lonoke.....	Dr. Fly.....	348	7	2.01
Miller.....	Dr. Campbell....	736	421	57.2
St. Francis....	Dr. Bradford....	1,427	439	30.76
Sevier.....	Dr. Campbell....	391	60	15.34
White.....	Dr. Fly.....	269	17	6.3
Woodruff.....	Dr. Bradford....	940	414	44.04
Total.....		7,541	1,681	22.2

II. SANITARY SURVEY.

Sanitary survey, based on an inspection of privy conditions at at least 100 country homes.

Doctor and County	TYPE OF PRIVY							Sanitary Index
	A	B	C	D	E	F -	Total	
Dr. Campbell—Conway.....	---	---	---	---	120	240	360	3.33
Dr. Jacocks—Faulkner.....	---	---	---	---	112	375	487	2.3
Dr. Fly—Independence.....	---	---	---	---	159	347	506	3.14
Dr. Bradford—Lee.....	---	---	---	---	142	536	678	2.09
Dr. Fly—Lonoke.....	---	---	---	---	211	309	520	4.05
Dr. Campbell—Miller.....	---	---	---	---	231	113	344	6.71
Dr. Campbell—Ouachita.....	---	---	---	---	459	133	592	7.75
Dr. Bradford—St. Francis.....	---	---	---	---	228	486	714	3.19
Dr. Campbell—Sevier.....	---	---	---	---	293	111	404	7.25
Dr. Fly—White.....	---	---	---	---	308	197	505	6.09
Total.....	---	---	---	---	2,263	2,847	5,110	-----

III. WORK OF COUNTY DISPENSARIES.

Doctor and County	Amount of County Appropriation	Amount Expended	Number Microscopic Examinations			NUMBER PERSONS AND TIMES TREATED						Total Treatments
			Pos.	Neg.	Total	One	Two	Three	Four	Five	Six	
Campbell—Clark.....	\$ 200 00	\$ 155 96	129	987	1,126	127	21	3	—	—	—	151
Fly—Cleveland.....	150 00	104 28	243	197	440	238	18	—	—	—	—	256
Campbell—Conway.....	250 00	152 25	13	1,233	1,246	11	4	—	—	—	—	15
Fly—Dallas.....	150 00	149 72	813	882	1,695	796	75	1	—	—	—	872
Jacocks—Faulkner.....	300 00	197 37	29	2,427	2,456	26	18	14	1	—	—	59
Bradford—Lee.....	200 00	121 15	187	768	955	167	14	—	—	—	—	181
Fly—Lonoke.....	200 00	132 04	10	549	559	9	1	—	—	—	—	10
Campbell—Miller.....	20 62	20 62	622	634	1,256	378	57	6	—	—	—	441
Campbell—Ouachita.....	150 00	130 10	531	1,305	1,836	561	50	4	—	—	—	615
Bradford—St. Francis.....	150 00	98 54	607	1,581	2,188	382	13	1	—	—	—	396
Campbell—Sevier.....	150 00	88 51	197	1,307	1,504	175	87	2	—	—	—	244
Bradford—Woodruff.....	150 00	110 27	770	1,138	1,908	524	229	—	—	—	—	753
Total.....	\$2,070 62	\$1,460 81	4,151	13,018	17,169	3,394	567	31	1	—	—	3,993

IV. WORK OF LABORATORY.

	Total During 1913
Number specimens examined.....	446
Number specimens showing hookworm infection.....	73
Number specimens showing <i>Ascaris</i>	11
Number specimens showing <i>Hymenolepis</i>	11
Number specimens showing <i>Trichocephalus</i>.....	.....
Number specimens showing <i>Oxyuris</i>	5
Number specimens showing <i>Tenia Saginata</i>	4
Other Parasites.....	8
Number specimens showing infection.....	112
Number specimens negative.....	334

V. WORK OF GENERAL PRACTITIONERS OF MEDICINE.

(Number of Physicians in State, 3,600)	
Number of physicians personally visited.....	462
Number of lectures to physicians.....	55
Number of circulars or bulletins to physicians.....	7,022
Number of letters or post cards to physicians.....	
Number physicians reporting treating Uncinariasis.....	*
Number of persons reported treated by physicians.....	1,500

VI. EDUCATING THE PEOPLE IN SANITATION.
(By Field Directors).

1. By Public Lectures:	
Number public lectures delivered.....	507
Estimated number attending.....	50,139
2. Through the Schools:	
Number teachers visited.....	2,199
Number letters to teachers.....	.....
Number pamphlets and bulletins to teachers.....	.....
3. Through the Press:	
Number papers personally visited.....	139
Number letters to editors.....	.....
Number articles furnished for publication.....	207

GEORGIA.**I. INFECTION SURVEY.**

Infection survey, based on an examination of at least 200 children between the ages of 6 and 18 years, taken at random from the country.

County	Surveyed by	Number Examined	Number Infected	Per cent. of Infection
Ben Hill.....	Dr. Henry.....	488	385	78.
Bulloch.....	Dr. Dobbs.....	376	344	91.4
Burke.....	Dr. Wood.....	369	357	96.74
Hall.....	Dr. Verner.....	573	407	70.9
Hancock.....	Dr. Wood.....	373	151	40.48
Irwin.....	Dr. Henry.....	303	292	96.3
Jefferson.....	Dr. Wood.....	288	262	90.9
Jenkins.....	Dr. Wood.....	422	400	94.78
Liberty.....	Dr. Abercrombie	266	239	89.94
Rabun.....	Dr. Abercrombie	445	254	57.0
Screven.....	Dr. Henry.....	796	771	96.0
Stephens.....	Dr. Verner.....	209	156	74.6
Wayne.....	Dr. Abercrombie	692	555	80.2
Wilcox.....	Dr. Wood.....	213	143	67.13
Wilkes.....	Dr. Wood.....	270	128	47.4
Total.....		6,083	4,844	79.6

II. SANITARY SURVEY.

Sanitary survey, based on an inspection of privy conditions at at least 100 country homes.

Doctor and County	TYPE OF PRIVY							Sanitary Index
	A	B	C	D	E	F	Total	
Dr. Henry—Ben Hill.....	---	---	---	---	192	17	209	9.18
Dr. Dobbs—Bulloch.....	---	---	---	---	249	60	309	8.05
Dr. Wood—Burke.....	---	---	---	---	96	138	234	4.1
Dr. Abercrombie—Clinch.....	---	---	---	---	190	50	240	7.9
Dr. Henry—Dooly.....	---	---	---	---	167	7	174	9.6
*Dr. Verner—Hall.....	---	---	---	---	159	239	398	3.99
Dr. Wood—Hancock.....	---	---	---	---	195	88	283	6.89
Dr. Henry—Irwin.....	---	---	---	---	199	13	212	9.4
Dr. Dobbs—Jackson.....	---	---	---	---	163	54	217	7.5
Dr. Wood—Jefferson.....	---	---	---	---	201	98	299	6.72
Dr. Wood—Jenkins.....	---	---	---	---	181	55	236	7.6
Dr. Wood—Johnson.....	---	---	---	---	115	85	200	5.75
Dr. Abercrombie—Liberty.....	---	---	---	---	188	22	210	8.95
Dr. Abercrombie—McIntosh.....	---	---	---	---	135	---	135	10.
Dr. Abercrombie—Rabun.....	---	---	---	---	84	61	145	5.79
Dr. Henry—Screven.....	---	---	---	---	513	134	647	7.9
Dr. Verner—Stephens.....	---	---	---	---	242	115	357	6.77
Dr. Wood—Warren.....	---	---	---	---	122	57	179	6.8
Dr. Abercrombie—Wayne.....	---	---	---	---	405	5	410	9.87
Dr. Henry—Wilcox.....	---	---	---	---	83	23	106	7.83
Dr. Wood—Wilkes.....	---	---	---	---	183	124	307	5.96
Total.....	---	---	---	---	4,062	1,445	5,507	-----

*Re-survey 1913.

III. WORK OF COUNTY DISPENSARIES.

Doctor and County	Amount of County Appropriation	Amount Expended	Number Microscopic Examinations			NUMBER PERSONS AND TIMES TREATED						Total Treatments
			Pos.	Neg.	Total	One	Two	Three	Four	Five	Six	
Henry—Ben Hill.....	\$ 150 00	\$ 149 25	524	280	804	703	181	35	8	1	—	928
Dobbs—Bulloch.....	150 00	146 56	604	237	841	694	140	35	10	1	—	790
Wood—Burke.....	150 00	149 40	757	406	1,163	757	148	37	3	1	—	946
Abercrombie—Charlton.....	75 00	53 40	115	220	335	115	19	9	6	—	—	149
Abercrombie—Clinch.....	75 00	53 40	223	59	282	223	40	12	4	1	—	280
Henry—Dooly.....	150 00	83 86	177	127	304	180	33	11	4	1	—	229
Abercrombie—Glynn.....	150 00	142 69	187	303	490	249	2	—	—	—	—	251
Henry and Verner—Hall.....	100 00	99 54	641	515	1,156	641	79	18	—	—	—	738
Wood—Hancock.....	150 00	110 00	157	429	586	157	24	8	1	—	—	190
Henry—Irwin.....	150 00	133 52	645	248	893	649	85	12	1	1	—	748
Wood—Jefferson.....	150 00	144 76	687	422	1,109	687	134	82	31	14	8	956
Wood—Jenkins.....	150 00	134 75	601	257	858	601	95	22	4	—	—	722
Abercrombie—Liberty.....	100 00	95 90	244	62	306	244	59	15	2	—	—	320
Abercrombie—McIntosh.....	100 00	67 22	169	128	297	169	66	22	—	—	—	257
Henry and Abercrombie—Rabun.....	100 00	97 42	267	329	596	305	63	21	5	1	—	395
Dobbs and Henry—Screven.....	142 50	142 50	1,508	561	2,069	1,568	582	127	22	—	—	2,299
Verner—Stephens.....	100 00	97 45	231	117	348	231	51	12	—	—	—	294
*Abercrombie—Ware.....	150 00	125 95	357	584	941	366	17	2	1	—	—	336
Wood—Warren.....	100 00	86 25	247	221	468	247	63	16	6	1	—	333
Abercrombie—Wayne.....	150 00	147 33	788	439	1,227	810	115	37	16	11	1	990
Wood—Wilkes.....	150 00	145 50	201	533	734	201	25	7	3	—	—	236
Henry—Wilcox.....	150 00	86 73	255	349	604	299	26	4	—	—	—	329
Total.....	\$2,842 40	\$2,493 38	9,585	6,626	16,211	10,006	2,047	544	127	33	9	12,766

*Indicates second round of Dispensary work.

IV. WORK OF LABORATORY.

	Total During 1913
Number specimens examined.....	3,789
Number specimens showing hookworm infection.....	1,623
Number specimens showing Ascaris.....	57
Number specimens showing Hymenolepis.....	82
Number specimens showing Trichocephalus.....	
Number specimens showing Fascialis Hepatica.....	
Number specimens showing Oxyuris.....	2
Number specimens showing Strongyloides.....	1
Number specimens showing Tenia Saginata.....	
Number specimens showing infection, 31 double.....	1,730
Number specimens negative.....	2,059

V. WORK OF GENERAL PRACTITIONERS OF MEDICINE.

(Number of Physicians in State, 3,120)	
Number of physicians personally visited.....	140
Number of lectures to physicians.....	18
Number of circulars or bulletins to physicians.....	9,183
Number of letters or post cards to physicians.....	3,340
Number physicians reporting treating Uncinariasis.....	426
Number of persons reported treated by physicians.....	5,733

VI. EDUCATING THE PEOPLE IN SANITATION.

(By Field Directors).

1. By Public Lectures:	
Number public lectures delivered.....	711
Estimated number attending.....	36,663
2. Through the Schools:	
Number teachers visited.....	129
Number letters to teachers.....	75
Number pamphlets and bulletins to teachers.....	340
3. By Bulletins, Leaflets and Other Literature:	
Number bulletins and leaflets distributed.....	21,370
Number sanitary-privy leaflets distributed.....	1,435
Number other literature distributed.....	3,800
4. Through the Press:	
Number papers personally visited.....	33
Number letters to editors.....	
Number articles furnished for publication.....	6

VII. NOTES ON WORK OF THE YEAR.

1. The State Board of Education, in classifying its schools, requires under the heading "Standard County School" that two sanitary privies be provided. Up to this time thirty-nine schools have qualified as "standards."

2. Every physician in Georgia, and 143 senior medical students, have been provided with charts on soil pollution and hookworm disease.

3. Definite instruction on hookworm disease is given by the two Georgia medical colleges in grade "A".

4. Hookworm disease has been eradicated from Jekyll's Island.

5. The State Board of Education adopted Ritchie's "Primer of Sanitation" and Hutchinson's Health Series for use in the public schools of Georgia during the next five years.

KENTUCKY.

I. INFECTION SURVEY.

Infection survey, based on an examination of at least 200 children between the ages of 6 and 18 years, taken at random from the country.

County	Surveyed by	Number Examined	Number Infected	Per cent. of Infection
Christian.....	Dr. Richmond...	1,173	22	1.9
Clark.....	Dr. Shirley.....	3,024	263	8.7
Harlan.....	Dr. Lock.....	5,477	2,279	41.6
Harrison.....	Dr. Shirley.....	2,022	39	1.9
Jefferson.....	Dr. Richmond...	4,852	469	9.6
Laurel.....	Dr. Lock.....	9,340	3,956	42.0
Leslie.....	Dr. Steele.....	3,364	2,149	63.8
McCreary.....	Dr. Steele.....	5,250	2,504	47.7
Madison.....	Drs. Lock and Shirley.....	3,981	745	18.7
Pulaski.....	Dr. Steele.....	8,009	1,608	20.0
Rockcastle.....	Dr. Lock.....	3,747	803	21.4
Rowan.....	Dr. Shirley.....	2,830	1,524	53.8
Whitley.....	Dr. Lock.....	9,503	3,960	40.1
Franklin.....	Dr. Steele.....	518	24	4.6
Bell.....	Dr. Lock.....	9,177	2,912	31.7
Hickman.....	Dr. Richmond...	1,404	20	1.4
Knox.....	Dr. Lock.....	7,919	3,052	38.5
Warren.....	.....	551	42	7.6
		82,141	26,371	32.1

II. SANITARY SURVEY.

Sanitary survey, based on an inspection of privy conditions at at least 100 country homes.

Doctor and County	TYPE OF PRIVY							Sanitary Index
	A	B	C	D	E	F	Total	
Dr. Richmond—Christian.....	3	---	---	7	120	15	145	11.5
Dr. Shirley—Clark.....	---	---	---	45	1,297	736	2,078	6.7
Dr. Lock—Harlan.....	---	---	1	---	16	261	278	.075
Dr. Shirley—Harrison.....	44	39	1	73	587	288	1,032	14.6
Dr. Lock—Laurel.....	---	---	1	7	132	388	528	2.92
Dr. Steele—Leslie.....	---	---	---	1	52	303	356	1.53
Dr. Steele—McCreary.....	---	1	11	41	521	263	837	7.74
Dr. Shirley—Madison.....	---	---	---	---	207	91	298	6.94
Dr. Steele—Pulaski.....	---	---	1	6	273	621	901	3.25
Dr. Lock—Rockcastle.....	---	---	---	5	59	405	469	1.52
Dr. Shirley—Rowan.....	---	---	---	2	811	2,079	2,892	2.82
Dr. Lock—Whitley.....	---	---	---	---	61	231	292	2.08
Dr. Richmond—Ballard.....	---	---	40	241	424	---	705	17.3
Dr. Richmond—Fulton.....	---	---	10	32	288	---	330	12.6
Dr. Richmond—Union.....	---	---	3	365	---	247	615	15.08
Dr. Richmond—McCracken.....	---	---	---	215	200	---	415	17.77
Dr. Lock—Clay.....	---	---	---	---	191	534	725	1.3
Dr. Richmond—Hickman.....	---	---	40	125	496	124	785	12.8
Total.....	47	40	108	1165	5,735	6,586	13,681	---

III. WORK OF COUNTY DISPENSARIES.

Doctor and County	Amount of County Appropriation	Amount Expended	Number Microscopic Examinations			NUMBER PERSONS AND TIMES TREATED						Total Treatments
			Pos.	Neg.	Total	One	Two	Three	Four	Five	Six	
Christian—Richmond.....	\$ 500 00	\$ 500 00	22	1,151	1,173	27	42	---	---	---	---	27
Harlan—Lock.....	250 00	250 00	2,086	2,861	4,957	2,096	37	---	---	---	---	2,138
Harrison—Shirley.....	400 00	400 00	39	1,983	2,022	37	7	---	---	---	---	44
Clark—Shirley.....	300 00	300 00	137	1,417	1,554	9	---	---	---	---	---	9
Jefferson—Richmond.....	250 00	250 00	75	1,415	1,490	76	---	---	---	---	---	76
Laurel—Lock.....	250 00	250 00	3,956	5,384	9,340	1,945	42	---	---	---	---	1,987
Leslie—Steele.....	300 00	300 00	1,788	818	2,606	1,788	16	---	---	---	---	1,804
McCreary—Steele.....	300 00	300 00	2,504	2,746	5,250	2,379	---	---	---	---	---	2,380
Madison—Lock & Shirley.....	400 00	400 00	528	2,853	3,381	413	2	---	---	---	---	415
Pulaski—Steele.....	300 00	300 00	1,608	6,401	8,009	1,408	---	---	---	---	---	1,408
Rockcastle—Lock.....	200 00	200 00	803	2,944	3,747	805	1	---	---	---	---	806
Rowan—Shirley.....	100 00	100 00	1,436	983	2,419	1,436	2	---	---	---	---	1,438
Whitley—Lock.....	200 00	200 00	2,219	3,269	5,488	1,074	25	---	---	---	---	1,099
Total.....	\$3,750 00	\$3,750 00	17,211	33,225	50,436	13,491	138	---	---	---	---	13,629

IV. WORK OF LABORATORY.

	Total During 1913
Number specimens examined.....	26,078
Number specimens showing hookworm infection.....	7,264
Number specimens showing Ascaris.....	7,958
Number specimens showing Hymenolepis.....	535
Number specimens showing Trichocephalus.....	2,897
Number specimens showing Oxyuris.....	96
Number specimens showing Tenia Saginata.....	5
Number specimens showing infection.....	11,441
Number specimens negative.....	14,637

V. WORK OF GENERAL PRACTITIONERS OF MEDICINE.

(Number of Physicians in State, 3,340)	
Number of physicians personally visited.....	5,227
Number of lectures to physicians.....	75
Number of circulars or bulletins to physicians.....	32,139
Number of letters or post cards to physicians.....	16,610
Number physicians reported treated Uncinariasis.....	314
Number of persons reported treated by physicians.....	29,720

VI. EDUCATING THE PEOPLE IN SANITATION.
(By Field Directors).

1. By Public Lectures:	
Number public lectures delivered.....	1,698
Estimated number attending.....	250,151
2. Through the Schools:	
Number teachers visited.....	384
Number letters to teachers.....	.....
Number pamphlets and bulletins to teachers.....	122
3. By Bulletins, Leaflets and Other Literature:	
Number bulletins and leaflets distributed.....	67,060
Number sanitary-privy leaflets distributed.....	.....
Number other literature distributed.....	.....
4. Through the Press:	
Number papers personally visited.....	411
Number letters to editors.....	38
Number articles furnished for publication.....	365

LOUISIANA.

I. INFECTION SURVEY.

Infection survey, based on an examination of at least 200 children between the ages of 6 and 18 years, taken at random from the country.

Parish	Surveyed by	Number Examined	Number Infected	Per cent. of Infection
Avoyelles.....	Dr. Adams.....	785	52	6.6
Bossier.....	Drs. Baucum and Trezevant....	1,152	414	35.9
Jackson.....	Dr. Trezevant...	2,838	2,267	79.8
Red River.....	Dr. Baucum....	524	234	44.6
Sabine.....	Dr. McKinney..	2,502	1,208	48.2
Allen.....	Dr. McKinney..	1,480	757	51.1
Ascension.....	Dr. Adams.....	376	40	10.6
Beauregard....	Dr. McKinney..	3,100	1,866	60.2
Calcasieu.....	Dr. McKinney..	1,414	463	32.7
Caldwell.....	Dr. Trezevant...	2,625	1,310	49.9
East Baton Rouge.....	Dr. Adams.....	1,054	209	19.8
East Feliciana..	Dr. Adams.....	750	159	21.2
Grant.....	Dr. Baucum....	2,038	1,222	59.9
Iberville.....	Dr. Adams.....	243	.....	.....
LaSalle.....	Dr. Baucum....	1,357	704	51.8
Natchitoches...	Dr. Baucum....	1,194	647	54.1
Ouachita.....	Dr. Wright.....	703	493	70.1
Point Coupee..	Dr. Adams.....	219	3	1.3
West Feliciana.	Dr. Adams.....	417	8	1.9
Total.....		24,771	12,056	48.9

II. SANITARY SURVEY.

Sanitary survey, based on an inspection of privy conditions at at least 100 country homes.

Doctor and Parish	TYPE OF PRIVY							Sanitary Index
	A	B	C	D	E	F	Total	
Dr. Adams—Avoyelles.....	---	---	---	195	210	5	410	17.0
Drs. Baucum and Trezevant—Bossier	---	---	---	---	162	178	340	4.7
Dr. Trezevant—Jackson.....	---	---	---	1	108	455	564	1.9
Dr. Baucum—Red River.....	---	---	---	---	71	134	205	3.4
Dr. McKinney—Sabine.....	---	---	---	---	39	422	461	.8
Dr. McKinney—Allen.....	---	---	---	5	160	140	305	6.41
Dr. Adams—Ascension.....	---	2	15	87	177	10	291	16.6
Dr. McKinney—Beauregard.....	---	---	---	---	275	173	448	6.1
Dr. McKinney—Calcasieu.....	---	---	---	13	200	31	244	9.5
Dr. Trezevant—Caldwell.....	---	---	---	1	321	582	904	3.55
Dr. Adams—East Baton Rouge.....	---	---	6	56	167	63	292	11.3
Dr. Baucum—Grant.....	---	---	---	---	91	133	224	4.0
Dr. Adams—Iberville.....	---	2	21	80	244	21	368	15.3
Dr. Baucum—LaSalle.....	---	---	---	---	38	176	214	1.7
Dr. Adams—Natchitoches.....	---	---	---	---	133	118	251	5.29
Dr. Wright—Ouachita.....	---	---	---	6	215	317	538	4.2
Dr. Adams—Point Coupee.....	4	---	8	57	181	40	290	13.8
Dr. Adams—W. Baton Rouge.....	---	---	---	41	170	---	211	12.9
Dr. Adams—West Feliciana.....	---	---	---	39	153	61	253	9.9
Total.....	4	4	50	581	3,115	3,059	6,813	---

III. WORK OF COUNTY DISPENSARIES.

Doctor and Parish	Amount of Parish Appropriation	Amount Expended	Number Microscopic Examinations			NUMBER PERSONS AND TIMES TREATED						Total Treatments
			Pos.	Neg.	Total	One	Two	Three	Four	Five	Six	
Porter—Allen.....	\$ 200 00	\$ 200 00	757	723	1,480	757	255	18				1,030
Adams—Ascension.....	100 00	32 00	40	336	376	40						40
Adams—Avoelles.....	100 00	42 00	52	733	785	50	1					51
McKinney—Beauregard.....	275 00	275 00	1,866	1,234	3,100	1,814	755	28	2			2,599
Baucum—Bossier.....	250 00	250 00	414	738	1,152	414	252	25				661
Porter—Calcasieu.....	200 00	200 00	463	951	1,414	463	463	463				1,389
Trezevant—Caldwell.....	271 00	271 00	1,310	1,315	2,625	1,197	90	22	2			1,311
Adams—E. Baton Rouge.....	100 00	34 40	137	564	701	137	6					143
Baucum—Grant.....	150 00	150 00	1,222	816	2,038	1,230	407	44	1			1,702
Adams—Iberville.....	100 00	17 00	243	243	243							
Trezevant—Jackson.....	200 00	200 00	2,267	571	2,838	1,954	287	26				2,267
Baucum—Natchitoches.....	200 00	200 00	647	547	1,194	647	363	62	3			1,075
Adams—Point Coupee.....	100 00	35 00	3	216	219	3						6
Baucum—Red River.....	200 00	200 00	234	290	524	234	126	12	2			374
McKinney—Sabine.....	200 00	200 00	1,208	1,294	2,502	1,208	557					1,765
Adams—W. Baton Rouge.....	100 00	21 30	1	187	188	1						1
Adams—W. Feliciana.....	100 00	60 00	8	409	417	8						8
Adams—E. Feliciana.....	100 00	100 00	159	591	750	159	33	8				200
Wright—Ouachita.....	200 00	200 00	493	210	703	820	77	14	2			913
Baucum—La Salle.....	150 00	150 00	704	653	1,357	691	220	- 4				915
Total.....	\$3,296 00	\$2,837 70	11,985	12,621	24,606	11,847	3,895	726	12			16,490

IV. WORK OF LABORATORY.

	Total During 1913
Number specimens examined.....	725
Number specimens showing hookworm infection.....	73
Number specimens showing Ascaris.....	110
Number specimens showing Hymenolepis.....	18
Number specimens showing Trichocephalus.....	35
Number specimens showing Oxyuris.....	5
Number specimens showing Tenia Saginata.....	4
Number specimens showing infection.....	112
Number specimens negative.....	613

V. WORK OF GENERAL PRACTITIONERS OF MEDICINE.

(Number of Physicians in State, 3,400)	
Number of physicians personally visited.....	975
Number of lectures to physicians.....	12
Number of circulars or bulletins to physicians.....	1,073
Number of letters or post cards to physicians.....	1,408
Number physicians reporting treating Uncinariasis.....	145
Number of persons reported treated by physicians.....	262

VI. EDUCATING THE PEOPLE IN SANITATION.

(By Field Directors).

1. By Public Lectures:	
Number public lectures delivered.....	100
Estimated number attending.....	10,709
2. Through the Schools:	
Number teachers visited.....	483
Number letters to teachers.....	157
Number pamphlets and bulletins to teachers.....	1,068
3. By Bulletins, Leaflets and Other Literature:	
Number bulletins and leaflets distributed.....	44,742
Number sanitary-privy leaflets distributed.....	
Number other literature distributed.....	
4. Through the Press:	
Number papers personally visited.....	79
Number letters to editors.....	61
Number articles furnished for publication.....	78

VII. NOTES ON WORK OF THE YEAR.

1. The growth of interest among the people in sanitation has been remarkable during 1913. Counties, in many instances, have been slow to appropriate \$150.00 to \$200.00 for county campaigns. On the last meeting day four counties appropriated \$250.00 each.

2. Dr. Lee examined the prisoners working in the State mines at Petros, with the following results:

	Number Examined	Number Infected	Per Cent. Infected.
White.....	100	22	22
Negro.....	191	0	0

The negroes all came from the country districts where infection might be expected. All new prisoners are now examined, and treated if infection is found.

3. As the outcome of three years' agitation a model Vital Statistics law has been enacted and put into operation.

TEXAS.

I. INFECTION SURVEY.

Infection survey, based on an examination of at least 200 children between the ages of 6 and 18 years, taken at random from the country.

County	Surveyed by	Number Examined	Number Infected	Per cent. of Infection
Harris.....	Dr. Hoch.....	1,665	926	55.6
Jefferson.....	Dr. Ferrell.....	526	64	12.1
Liberty.....	Dr. Judkins.....	600	361	60.1
Polk.....	Dr. Ferrell.....	861	487	56.5
San Jacinto.....	Dr. Brownlee.....	626	546	87.2
Walker.....	Dr. Judkins.....	839	480	57.2
Houston.....	Dr. Ferrell.....	706	388	54.9
San Augustine..	Dr. Judkins.....	534	447	83.7
Grimes.....	Dr. Brownlee...	804	388	48.2
Panola.....	Dr. Judkins.....	517	195	37.7
Waller.....	Dr. Brownlee.....	467	225	48.1
Orange.....	Dr. Ferrell.....	407	192	47.1
Smith.....	Dr. Judkins.....	525	60	11.4
Brazoria.....	Dr. Ferrell.....	305	31	10.1
Robertson.....	Dr. Brownlee...	275	59	21.4
Shelby.....	Dr. Judkins.....	1,151	430	37.3
Brazos.....	Dr. Brownlee...	677	33	4.8
Austin.....	Dr. Ferrell.....	372	22	5.9
Henderson.....	Dr. Judkins.....	950	253	26.6
Navarro.....	Dr. Brownlee...	1,169	169	14.4
Total.....		13,976	5,756	41.2

II. SANITARY SURVEY.

Sanitary survey, based on an inspection of privy conditions at at least 100 country homes.

Doctor and County	TYPE OF PRIVY						Sanitary Index
	A	B	C	D	E	F	Total
Dr. Hoch—Harris.....	1			2		241	246
Dr. Ferrell—Jefferson.....	58	20			195	40	313
Dr. Judkins—Liberty.....				87	5	100	192
Dr. Ferrell—Polk.....					71	221	298
Dr. Brownlee—San Jacinto.....	4	2			32	282	320
Dr. Judkins—Walker.....	44	42		94	100	43	323
Dr. Ferrell—Houston.....					98	188	286
Dr. Judkins—San Augustine.....				2	237	255	494
Dr. Brownlee—Grimes.....	2	2	92	141	420		657
Dr. Judkins—Panola.....		224	109	61	4		398
Dr. Brownlee—Waller.....			1	42	423		466
Dr. Ferrell—Orange.....			26	45	144		215
Dr. Judkins—Smith.....	92		59	135			286
Dr. Ferrell—Brazoria.....					112	112	224
Dr. Brownlee—Robertson.....				8	474	323	805
Dr. Judkins—Shelby.....		16	107	150	40		313
Dr. Brownlee—Brazos.....	14		20	178	345		557
Dr. Ferrell—Austin.....			74	160	18		252
Dr. Judkins—Henderson.....			118	270	40		428
Dr. Brownlee—Navarro.....	170		60	358	270		858
Total.....	136	291	324	934	2,731	3,509	7,925

III. WORK OF COUNTY DISPENSARIES.

Doctor and County	Amount of County Appropriation	Amount Expended	Number Microscopic Examinations			NUMBER PERSONS AND TIMES TREATED						Total Treatments
			Pos.	Neg.	Total	One	Two	Three	Four	Five	Six	
\$	300 00	\$ 262 60	1,569	2,631	4,200	1,498	64	4	---	---	---	1,566
	300 00	292 50	85	1,098	1,183	85	41	2	---	---	---	128
	300 00	300 00	601	931	1,532	586	178	19	---	---	---	783
	300 00	263 00	699	1,250	1,949	699	298	57	---	---	---	1,054
	300 00	294 10	1,050	460	1,510	1,050	54	9	---	---	---	1,113
	300 00	298 80	714	794	1,518	710	154	24	4	---	---	892
	300 00	284 65	586	1,014	1,600	586	179	36	---	---	---	801
	300 00	248 00	715	508	1,223	711	177	30	2	---	---	920
	300 00	296 80	688	1,379	2,067	688	18	2	---	---	---	708
	300 00	196 00	306	1,126	1,432	306	169	49	9	---	---	533
	300 00	296 35	332	830	1,163	332	12	6	---	---	---	350
	300 00	262 50	298	679	977	298	63	15	5	---	---	376
	300 00	164 00	79	1,124	1,203	78	73	41	5	---	---	197
	300 00	274 15	37	853	890	37	17	1	---	---	---	55
	300 00	278 50	94	615	709	94	10	2	---	---	---	106
	300 00	233 00	621	1,221	1,842	611	228	55	7	---	---	901
	300 00	295 95	68	1,292	1,360	60	6	3	---	---	---	69
	300 00	249 75	31	949	980	31	7	1	---	---	---	39
	300 00	198 85	354	1,159	1,513	354	48	8	1	---	---	411
	300 00	295 15	219	1,383	1,602	218	11	---	---	---	---	229
Total.....	\$6,000 00	\$5,284 65	9,416	21,296	30,453	9,032	1,807	364	28	---	---	11,231

IV. WORK OF LABORATORY.

	Total During 1913
Number specimens examined.....	1,084
Number specimens showing hookworm infection.....	70
Number specimens showing Ascaris.....	1
Number specimens showing Hymenolepis.....	8
Number specimens showing Trichocephalus.....	4
Number specimens showing Oxyuris.....	83
Number specimens showing Tenia Saginata.....	1,001
Number specimens showing infection.....	
Number specimens negative.....	

V. WORK OF GENERAL PRACTITIONERS OF MEDICINE.

(Number of Physicians in State, 5,126)	
Number of physicians personally visited.....	607
Number of lectures to physicians.....	8
Number of circulars or bulletins to physicians.....	1,108
Number of letters or post cards to physicians.....	11,661
Number physicians reporting treating Uncinariasis.....	844
Number of persons reported treated by physicians.....	1,685

**VI. EDUCATING THE PEOPLE IN SANITATION.
(By Field Directors).**

1. By Public Lectures:	
Number public lectures delivered.....	566
Estimated number attending.....	46,596
2. Through the Schools:	
Number teachers visited.....	300
Number letters to teachers.....	1,491
Number pamphlets and bulletins to teachers.....	1,491
3. By Bulletins, Leaflets and Other Literature:	
Number bulletins and leaflets distributed.....	55,512
Number sanitary-privy leaflets distributed.....	24,567
Number other literature distributed.....	43,603
4. Through the Press:	
Number papers personally visited.....	97
Number letters to editors.....	69
Number articles furnished for publication.....	191
5. Miscellaneous:	
Number county officials visited.....	578
Number letters to county officials.....	2,280
Number pamphlets and bulletins sent to county officials.....	6,840

VII. NOTES ON WORK OF THE YEAR.

1. The campaign in Texas covers an eighteen-months' period. The people are recognizing that sanitation is necessary for good health.

2. \$10,500 has been appropriated for campaigns in thirty-five counties.

3. Infection has been demonstrated in seventy-five counties; the eastern one-third of the State. The physicians in the remaining two-thirds of Texas have not had the opportunity to treat hookworm disease. Of the 2,200 physicians in the infection area, 1,002 have reported treating 4,915 cases of hookworm disease.

4. The rural school teachers and trustees have been our greatest help in reaching the rural homes.

VIRGINIA.

I. INFECTION SURVEY.

Infection survey, based on an examination of at least 200 children between the ages of 6 and 18 years, taken at random from the country.

County	Surveyed by	Number Examined	Number Infected	Per cent. of Infection
Albemarle.....	Dr. Brumfield...	330	83	25.1
Amelia.....	Dr. Miller.....	373	52	13.9
Appomattox....	Dr. Miller.....	1,303	393	30.1
Augusta.....	Dr. Miller.....	451	82	18.2
Buckingham....	Dr. Kolmer.....	918	264	28.7
Charlotte.....	Dr. Brumfield...	404	95	23.5
Dickenson.....	Dr. Brumfield...	840	391	46.5
Fluvanna.....	Dr. Miller.....	485	16	3.3
Hanover.....	Dr. Lickle.....	201	87	43.2
Lee.....	Dr. Brumfield...	1,969	759	38.5
Nelson.....	Dr. Brumfield...	218	45	20.6
Orange.....	Dr. Brumfield...	1,029	210	20.4
Prince Edward..	Dr. Miller.....	1,250	316	25.2
Rockingham....	Dr. Miller.....	951	97	10.2
Rockbridge....	Dr. Miller.....	989	188	19.0
Spottsylvania..	Dr. Lickle.....	589	59	10.0
Surrey.....	Dr. Kolmer.....	490	89	18.1
Sussex.....	Dr. Kolmer.....	863	245	28.4
Tazewell.....	Dr. Brumfield...	340	5	1.4
Washington....	Dr. Brumfield...	220	21	9.5
Wise.....	Dr. Brumfield...	815	396	48.6
Total.....		15,028	3,893	25.9

II. SANITARY SURVEY.

Sanitary survey, based on an inspection of privy conditions at at least 100 country homes.

Doctor and County	TYPE OF PRIVY							Sanitary Index
	A	B	C	D	E	F	Total	
Dr. Fisher—Buckingham.....	---	---	---	4	76	123	203	4.2
Dr. Fisher—Franklin.....	---	1	---	4	122	80	207	6.7
Dr. Fisher—Henry.....	---	---	---	3	86	122	211	4.4
Dr. Fisher—Patrick.....	---	---	---	---	53	152	205	2.6
Dr. Fisher—Roanoke.....	2	---	---	14	167	20	203	10.9
• Total.....	2	1	---	25	504	497	1,029	-----

III. WORK OF COUNTY DISPENSARIES.

Doctor and County	Amount of County Appropriation	Amount Expended	Number Microscopic Examinations			NUMBER PERSONS AND TIMES TREATED						Total Treatments
			Pos.	Neg.	Total	One	Two	Three	Four	Five	Six	
Wise—Brumfield.....	\$ 100 00	\$ 100 00	923	1,128	2,051	923	916	900	-----	-----	-----	2,739
Dickenson—Brumfield....	100 00	100 00	302	1,679	1,981	302	302	302	-----	-----	-----	906
Hanover—Miller.....	100 00	100 00	717	1,276	1,993	717	717	717	-----	-----	-----	2,151
Appomattox—Miller.....	100 00	100 00	638	2,666	3,304	638	638	638	-----	-----	-----	1,914
Roanoke—Lickie.....	100 00	100 00	19	391	410	19	19	19	-----	-----	-----	57
Lee—Brumfield.....	100 00	100 00	2,332	6,681	9,013	2,332	2,332	2,332	-----	-----	-----	6,986
Pr. Edward—Miller.....	100 00	100 00	497	2,661	3,158	497	497	497	-----	-----	-----	1,491
Surry—Kolmer.....	100 00	100 00	146	1,257	1,403	146	146	146	-----	-----	-----	438
Tazewell—Brumfield.....	100 00	100 00	12	773	785	12	12	12	-----	-----	-----	36
Sussex—Kolmer.....	100 00	100 00	365	1,684	2,049	365	365	365	-----	-----	-----	1,065
Amelia—Miller.....	100 00	100 00	79	953	1,032	79	79	79	-----	-----	-----	237
Charlotte—Brumfield....	100 00	100 00	155	721	876	155	155	155	-----	-----	-----	465
Buckingham—Kolmer.....	100 00	100 00	372	1,783	2,165	372	372	372	-----	-----	-----	1,116
Total.....	\$1,300 00	\$1,200 00	6,557	23,663	30,220	6,557	6,550	6,534	-----	-----	-----	19,641

IV. WORK OF LABORATORY.

	Total During 1913
Number specimens examined.....	8,021
Number specimens showing hookworm infection.....	1,338
Number specimens showing Ascaris.....	1,587
Number specimens showing Hymenolepis.....	26
Number specimens showing Trichocephalus.....	229
Number specimens showing Oxyuris.....	15
Number specimens showing Tenia Saginata.....	
Number specimens showing infection.....	3,127
Number specimens negative.....	4,894

V. WORK OF GENERAL PRACTITIONERS OF MEDICINE.

(Number of Physicians in State, 2,357)	
Number of physicians personally visited.....	491
Number of lectures to physicians.....	9
Number of circulars or bulletins to physicians.....	4,600
Number of letters or post cards to physicians.....	6,900
Number physicians reporting treating Uncinariasis.....	363
Number of persons reported treated by physicians.....	1,264

VI. EDUCATING THE PEOPLE IN SANITATION. (By Field Directors).

1. By Public Lectures:	
Number public lectures delivered.....	620
Estimated number attending.....	52,015
2. Through the Schools:	
Number teachers visited.....	405
Number letters to teachers.....	450
Number pamphlets and bulletins to teachers.....	
3. By Bulletins, Leaflets and Other Literature:	
Number bulletins and leaflets distributed.....	37,000
Number sanitary-privy leaflets distributed.....	30,000
Number other literature distributed.....	
4. Through the Press:	
Number papers personally visited.....	38
Number letters to editors.....	
Number articles furnished for publication.....	110

VII. NOTES ON WORK OF YEAR.

1. During the year 102 privies were built at rural colored schools in the twenty-five counties which now have a colored rural school supervisor.
2. The State Board of Education has served notice on all local boards of school trustees that sanitary privies must be erected during the coming year under penalty of withdrawal of State aid.
3. On Lincoln's birthday 35,000 colored children received instruction in the sanitary catechism prepared by the Department, and including matter on hookworm disease.
4. A personal visit by the State Director to Richmond county, where work was first begun in May, 1910, showed marked improvement in the economic conditions of the inhabitants of the heavily infected Haynesville district. (See map, fig. 19.)
5. During the year, through co-operation with the University of Virginia and the State Health Department, complete medical inspection was made of the school children of Orange county, including examination for animal parasites.
6. During the year 903 treatments were sent to physicians upon request for their patients.

CHAPTER III.

HALF-TONE ILLUSTRATIONS



Fig. 1—Showing that hookworm does not ask "Who's who." a. Lou Maddison, Bradley Co., Tenn., age 18 months. Infected; and improved with treatment. One of a family of twelve all infected. b. This couple infected at age of 85 in McCreary Co., Ky. c. Two infected girls who live in house seen in background. Members of one of Miss. best families.

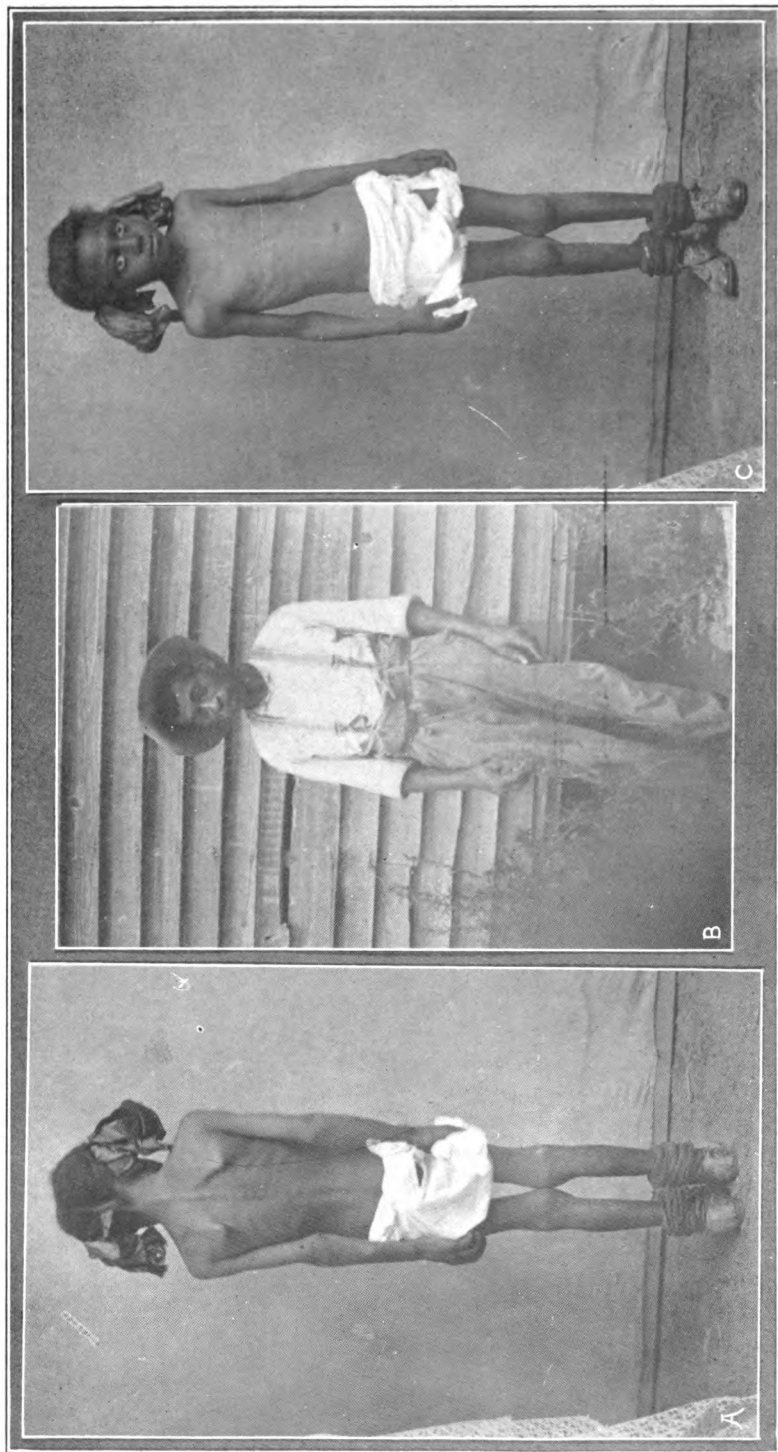


Fig. 2—Hookworm disease is no respecter of race. a. and c. Lena Bell Tolan, of Arkansas, age 11 years, weight 33 pounds, under treatment. b. Negro farmer of Rowan Co., N. C., age 46. Infected. Treated at free dispensary.

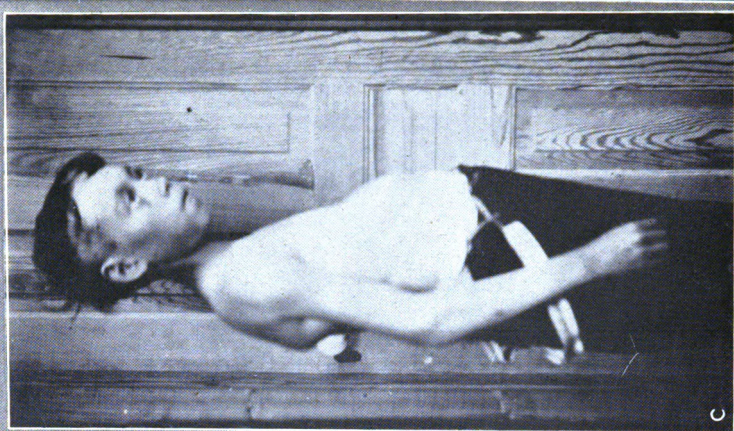


Fig. 3—Showing effects of hookworm disease. a. Small boy is Herrod Moore, of Heber Springs, Ark., called "Chalky" from the extreme pallor of his face. "Chalky" is 18 years old, weighs 82 pounds, uses chewing tobacco, snuff, and profane language. He is uncle of the larger boy, is two months older and 50 pounds lighter than his nephew, who is not infected. b. Three heavily infected children; ages 13, 9, 7 years. The boy was treated for consumption. 20 grs. of thymol brought 234 hookworms, a dwarf tape worm and almost complete recovery. Wise Co., Va. c. Isaac Shores, of Stokes Co., N. C. Severe infection. Note the "angel wings" shoulder blades and the "pot belly," characteristic symptoms.

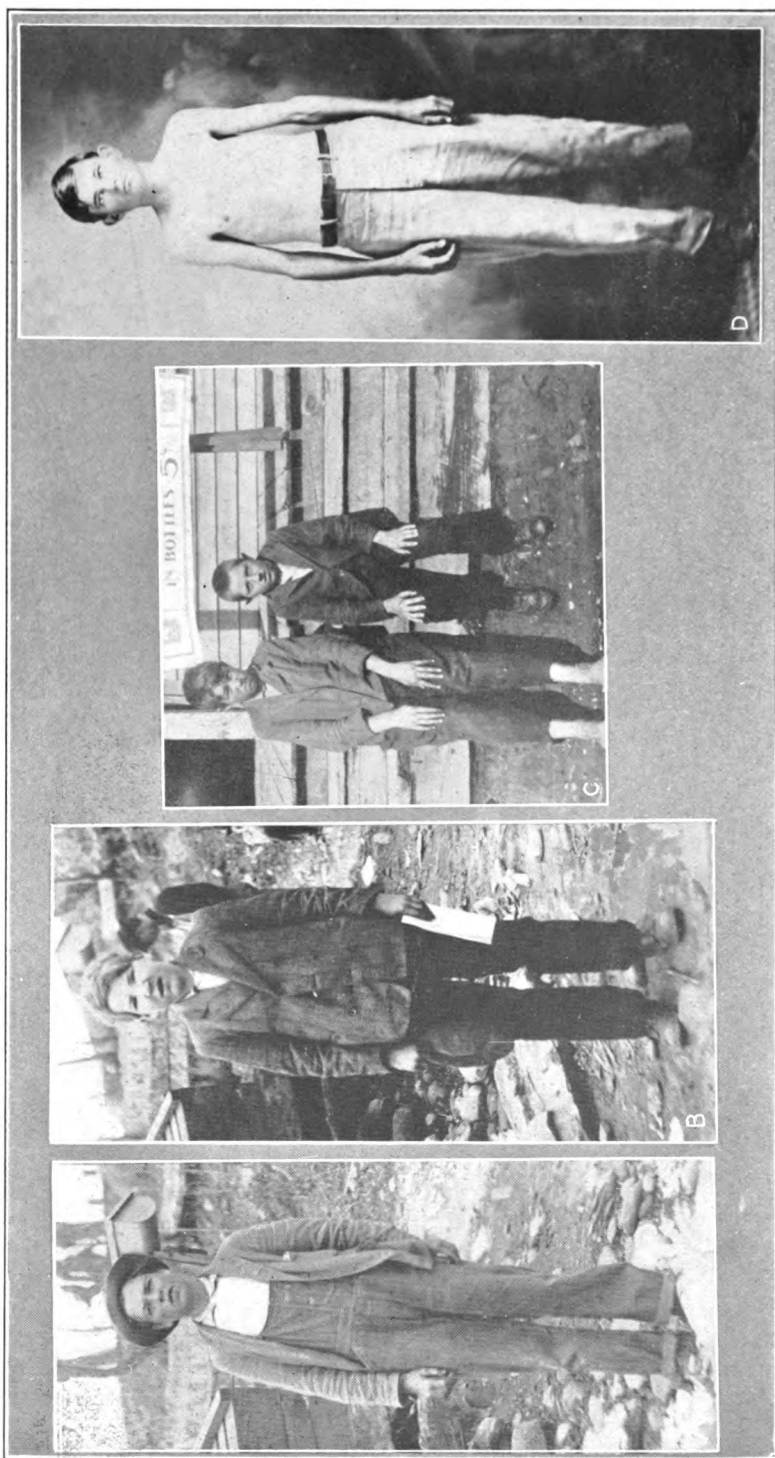


Fig. 4—Showing effects of hookworm disease. a. Appetite often perverted. Joseph Fowler, Cocke Co., Tenn., "has eaten one whole Bible and almost all of a second one." b. Typical infection. Cocke Co., Tenn. c. J. H. Brookfield and Franklin Crow, ages 12 years. The development of body and mind retarded. d. Texas boy with moderate infection.

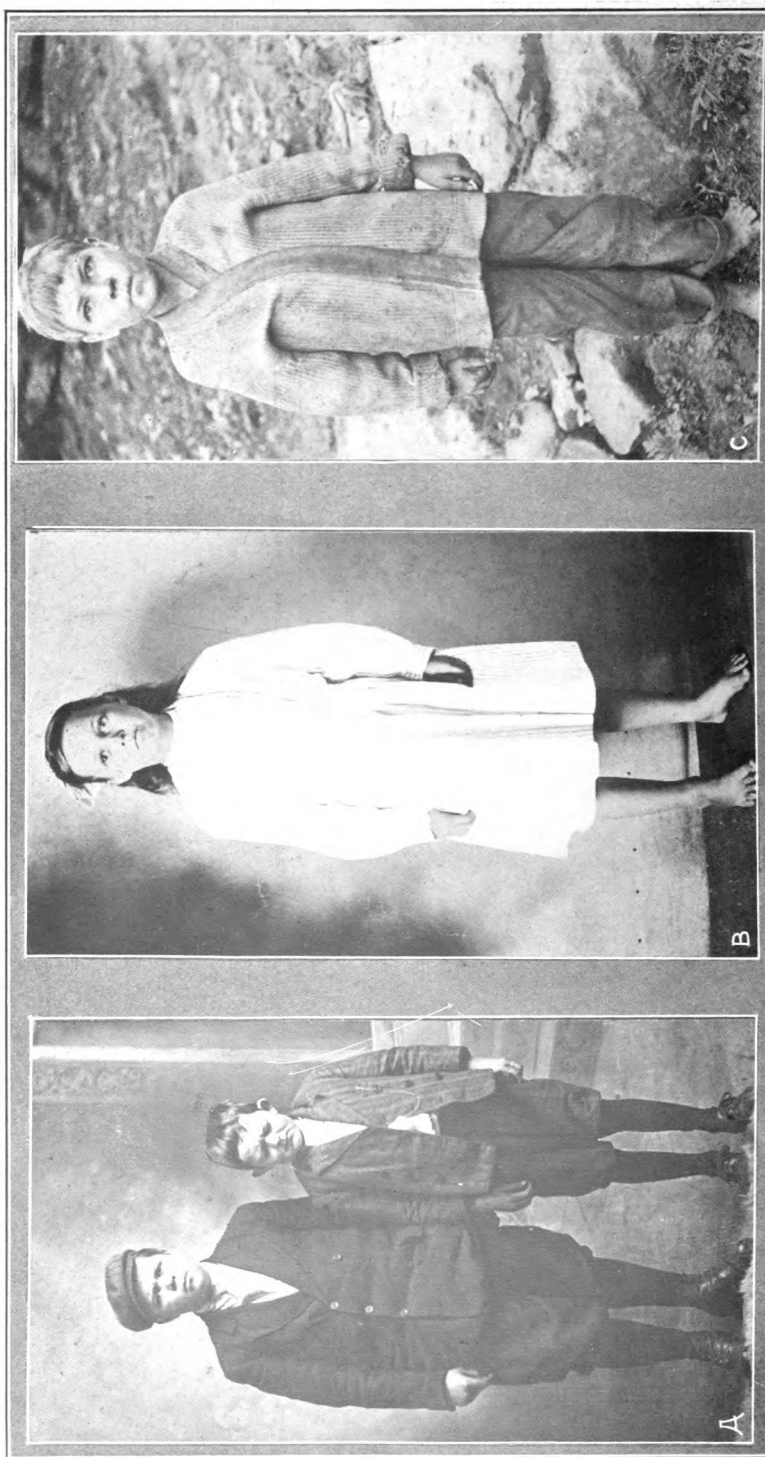
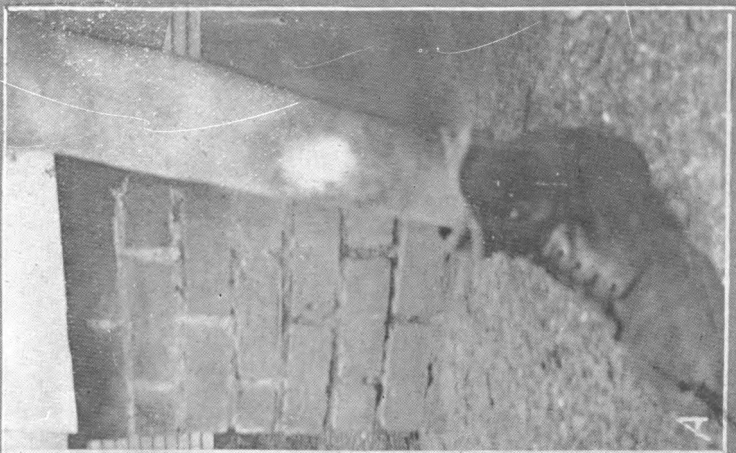
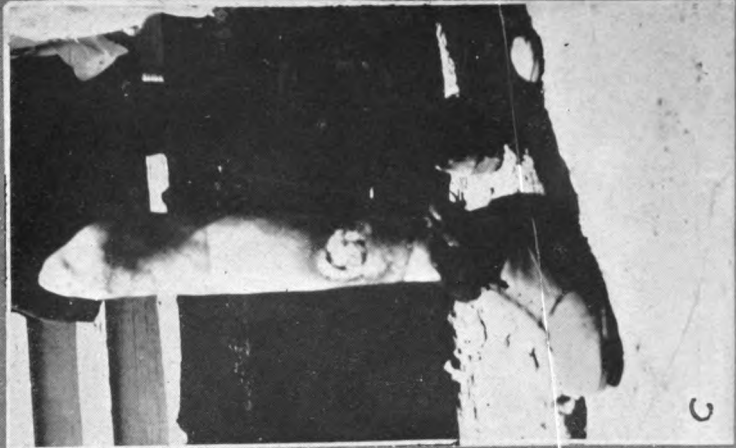


Fig. 5—Showing effects of hookworm disease. a. Two South Carolina boys the same age. The smaller one is severely infected. b. Severe infection, Mecklenburg Co., Va. The anemia is severe. c. Severe infection in a Kentucky boy. Note the fish-like stare in b and c. a characteristic symptom.



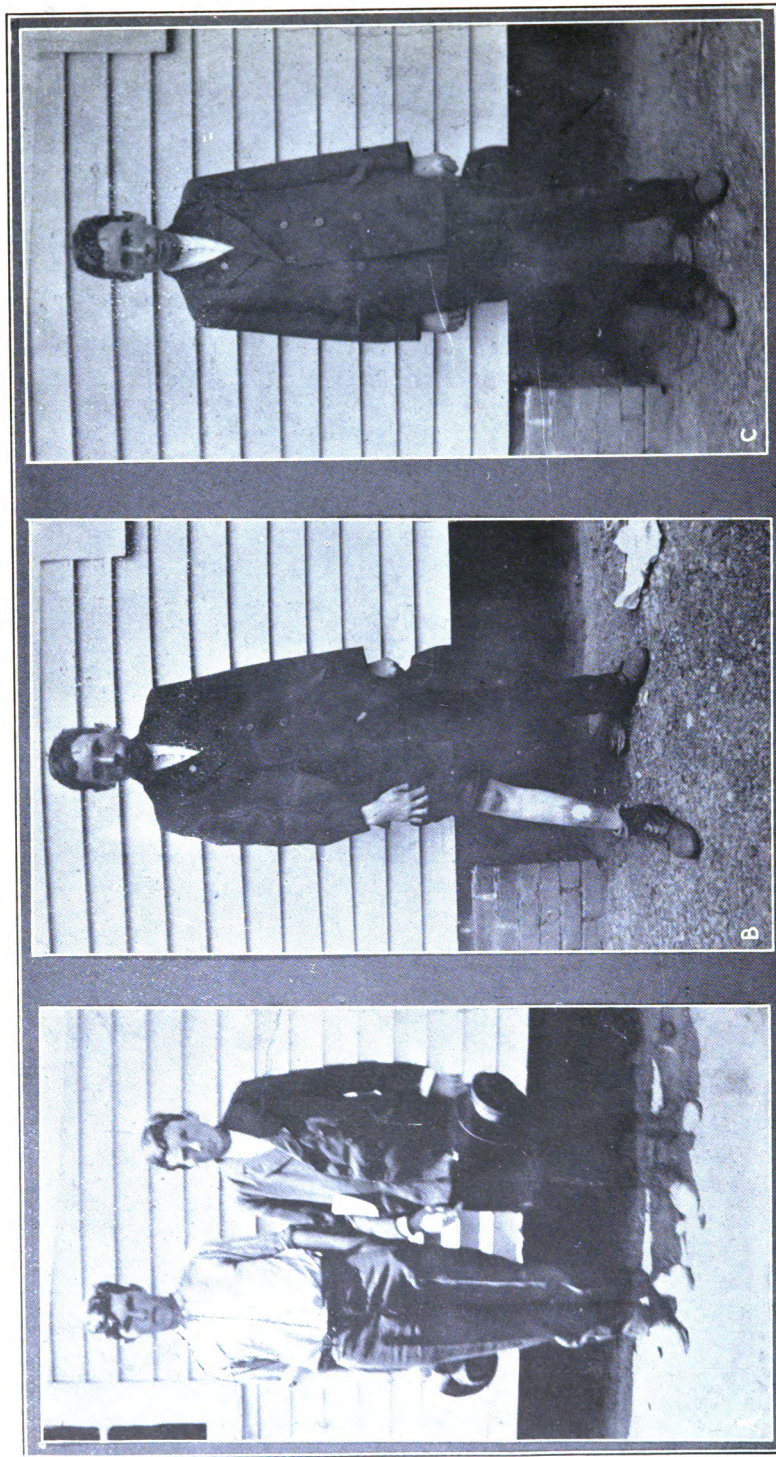


Fig. 7—Showing effects of hookworm disease. J. W. Morris, Cabarrus Co., N. C., age 17, weight 107. a. Standing with boy his own age selected at random. b. Showing anemic ulcer which began healing after treatment with thymol. c. Fourteen days after first picture, weight 111 pounds, a gain of 4 pounds.

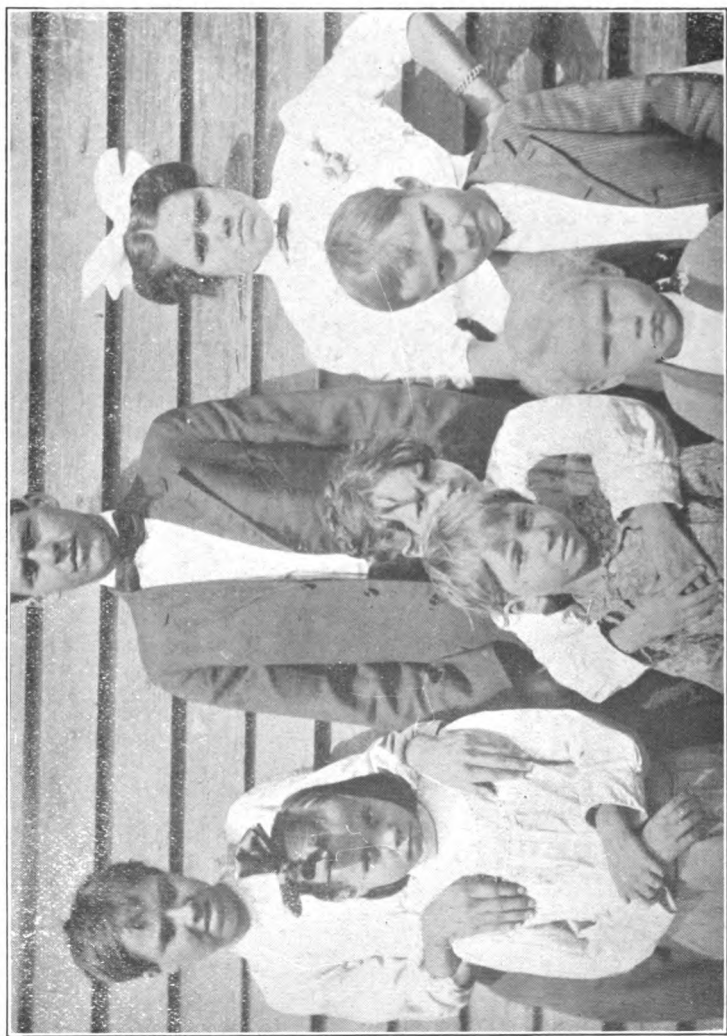


Fig. 8—Showing one of the common intercurrent diseases. All infected with hookworm; all have pellagra. The two diseases frequently found together.

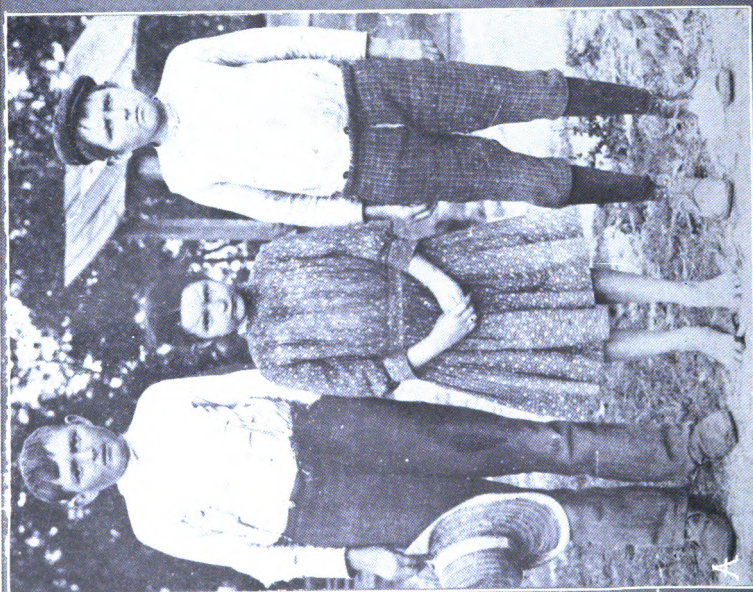


Fig. 9—Showing the effects of hookworm disease on groups. a. The three Tarpley children, Toombsboro, Ga., treated at dispensary; three of the family have died of "dropsy."

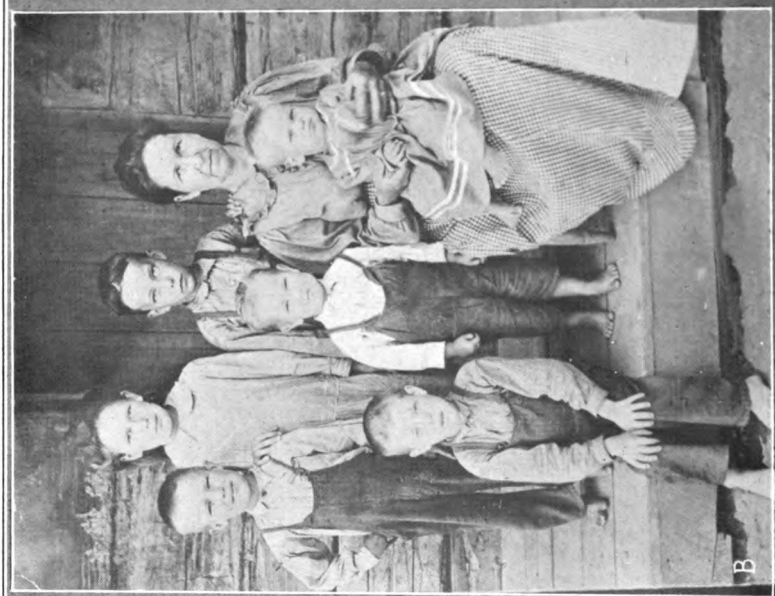
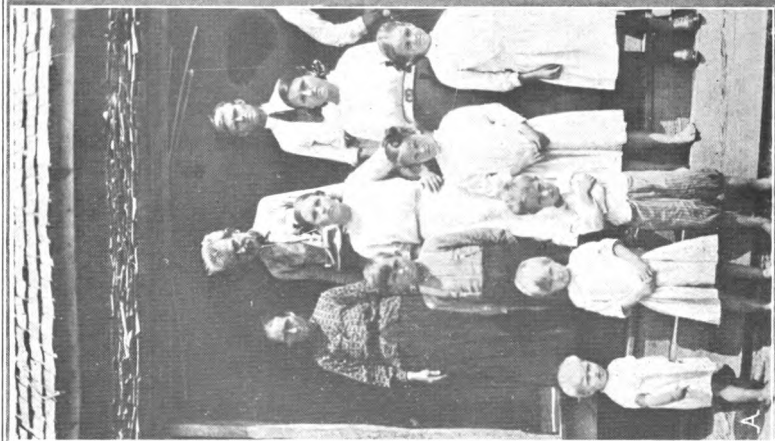


Fig. 10—Showing whole families infected. a. Forrest county, Miss.; b. Owsley county, Ky.

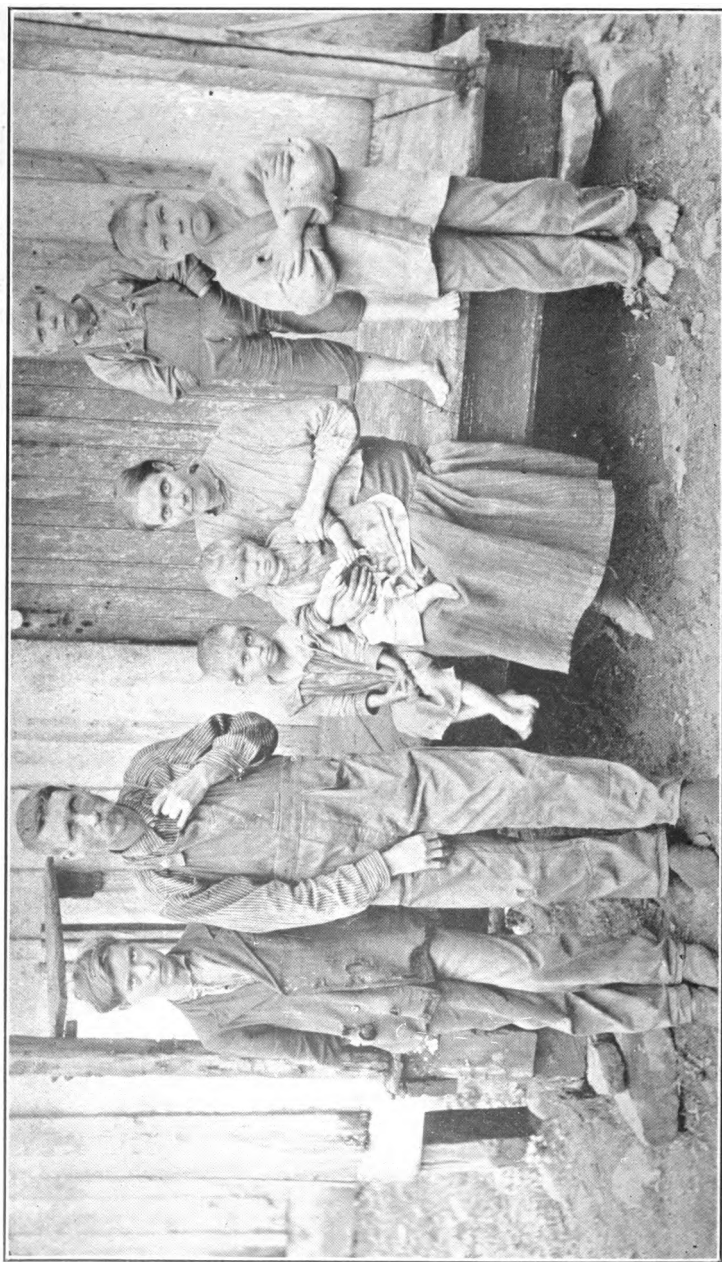


Fig. 11.—Bryant family, of Kentucky; heavy infection. Note the "fish stare" of the eyes.



Fig. 12—Showing whole family infected. Girl to left is a daughter-in-law, has light infection. Kentucky.

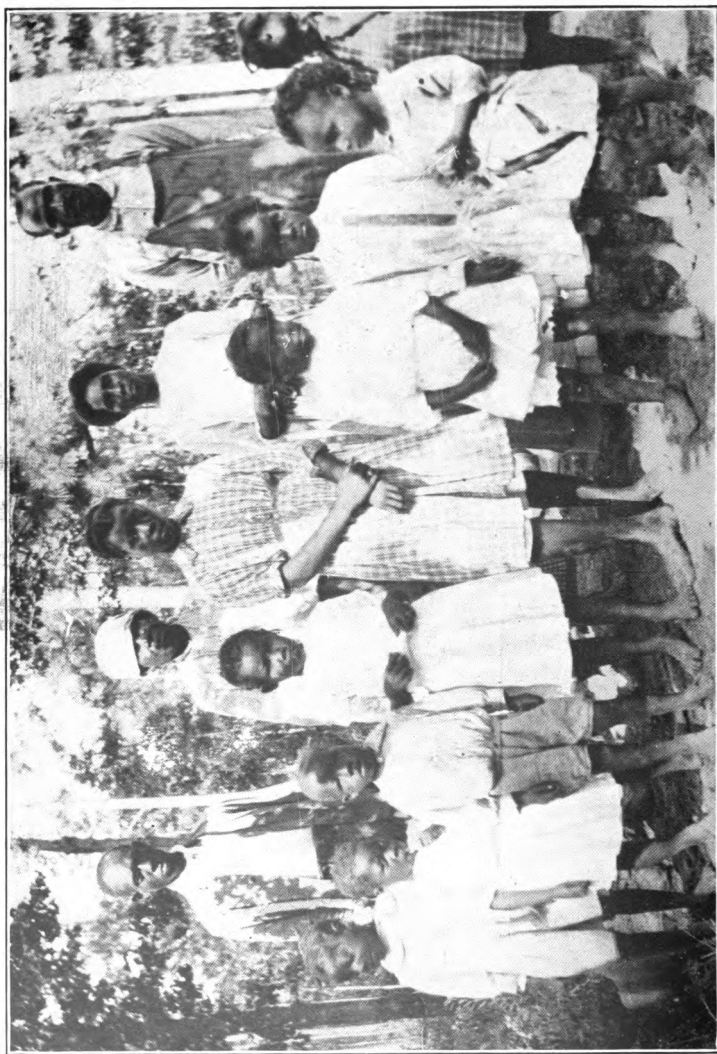


Fig. 13- Showing infected group in Marengo county, Alabama. Number of persons examined in county, 2,043; number infected and treated, 891.



Fig. 14—Showing effect of hookworm disease on the school. Public rural school, Washington county, Alabama. 75 per cent. infection.

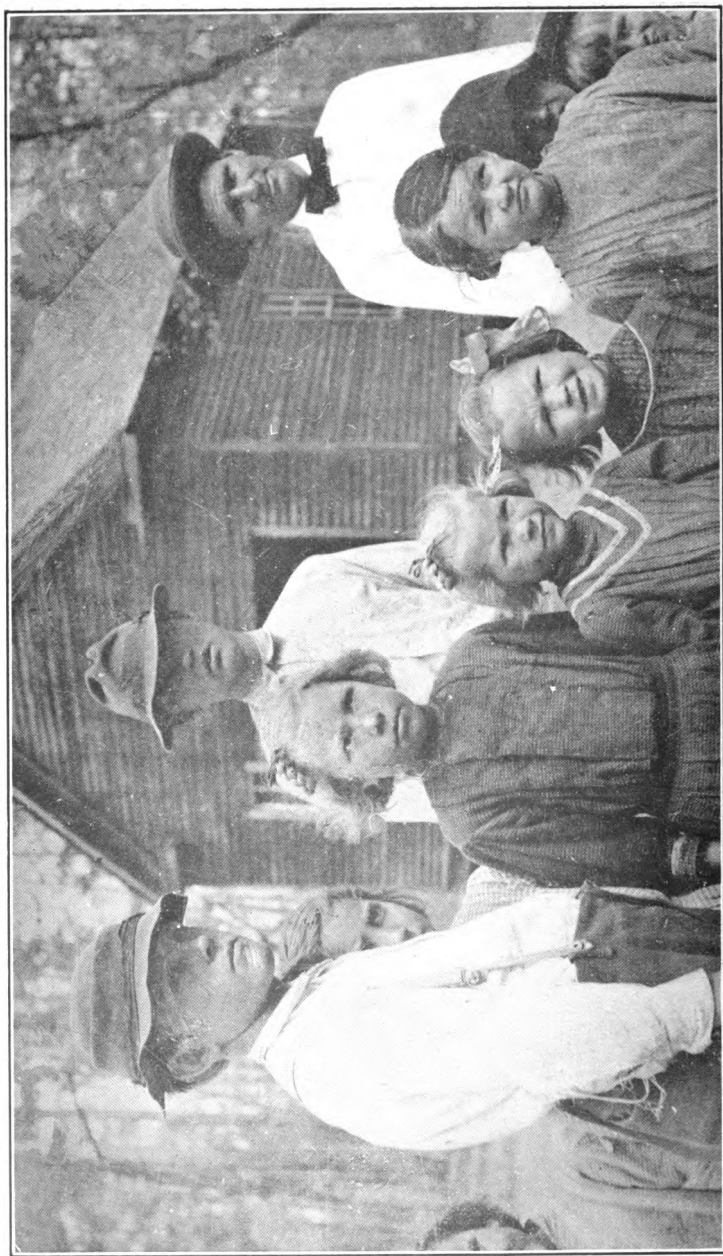


Fig. 15—Ehon school, Columbia, Miss. 100 per cent. infection, including the teacher.

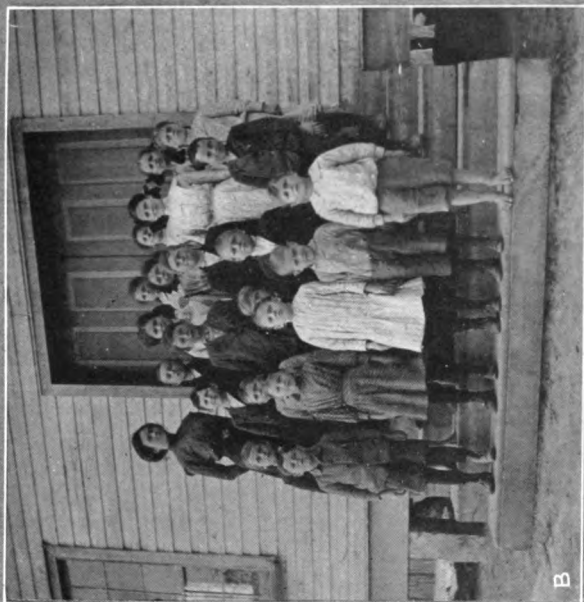


Fig. 16—Public schools. a. Frank school, Irwin Co., Ga. 100 per cent. infection. b. Longstrom school, 21 pupils. 100 per cent. infection; no privies.



Fig. 17—Public school, Naillon, Cocke Co., Tenn.



Fig. 18—Those children of Naillon school (see Fig. 17) who were found to have hookworm infection.

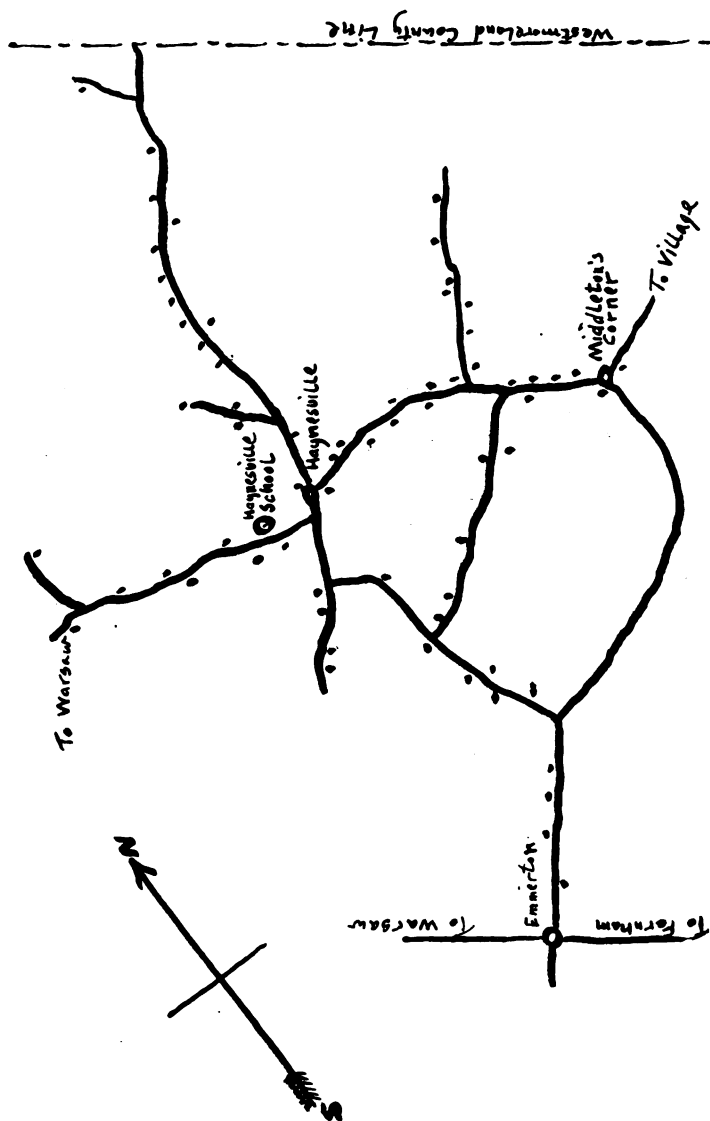


Fig. 19—Showing hookworm disease in the school district. The dots show the location of 67 families on the neighborhood roads.

No. families in community.....	67
No. families infected.....	67
No. persons in community.....	362
No. persons infected.....	281

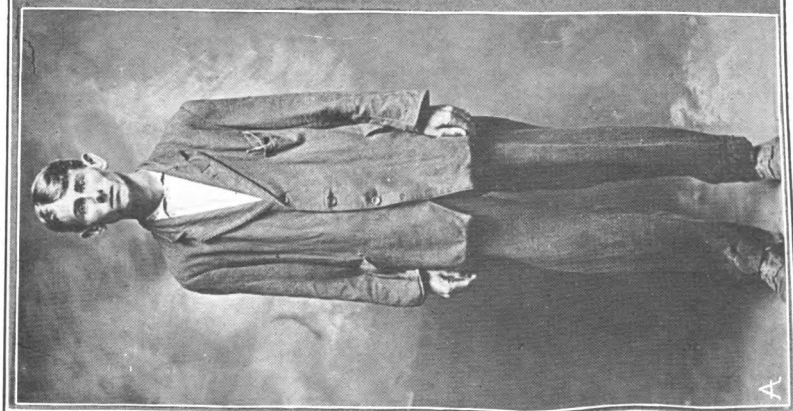


Fig. 20—Results of treatment. a. Willie Livingston, Prentiss county, Miss.; age 19, weight 109 pounds; treated; gained 18 pounds in three weeks. (See pages 43-44.) b. Bennie Landrum, Alabama; stretcher case; cured; now picks 75 pounds of cotton a day. c. Eugene Jenkins, Gillsburg, Miss., age 21, weight 65 pounds; gained 10 pounds after one treatment.

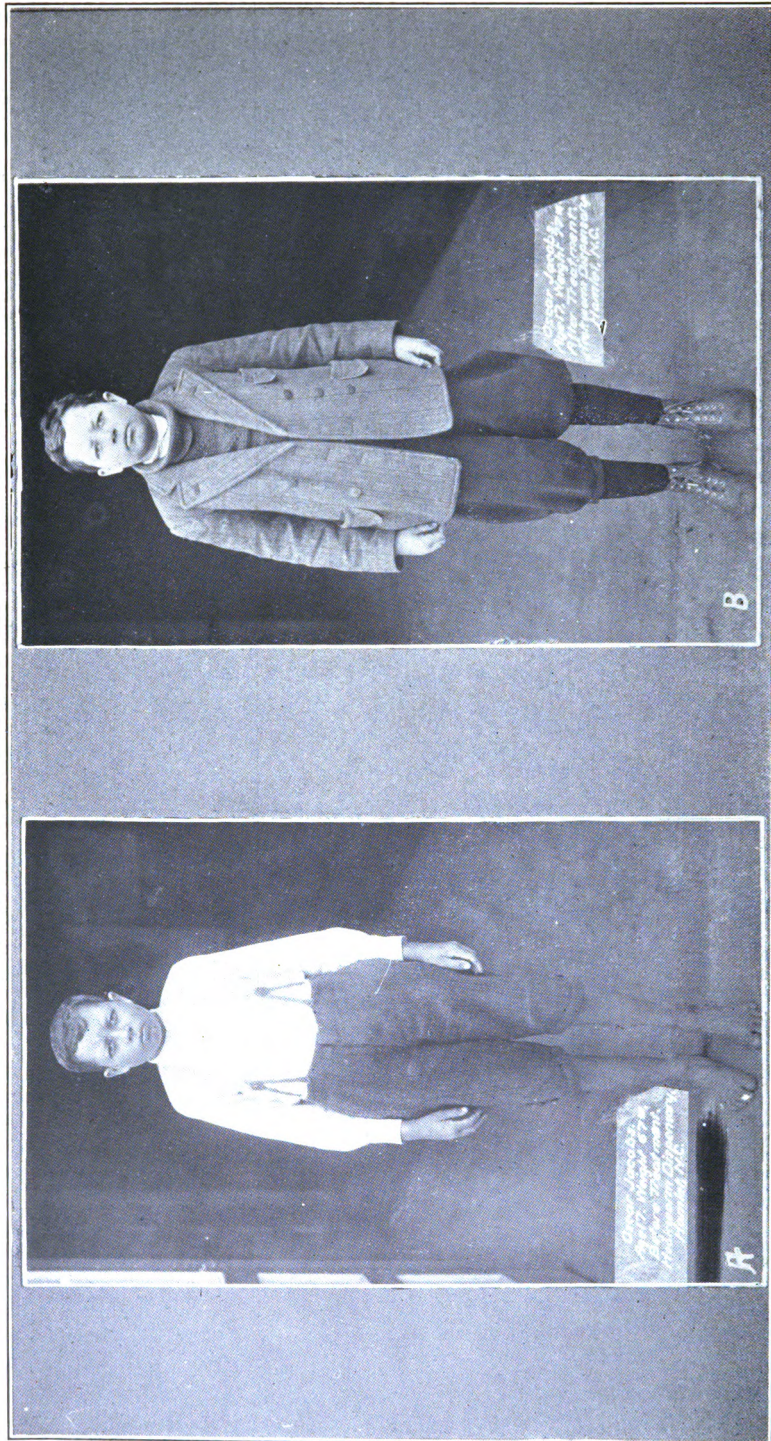


Fig. 21—Oscar Jacobs, Hamlet, N. C.: age 17, weight 67 pounds. a. Before being treated; b. Three weeks later; weight 77 pounds; general physical condition much improved.

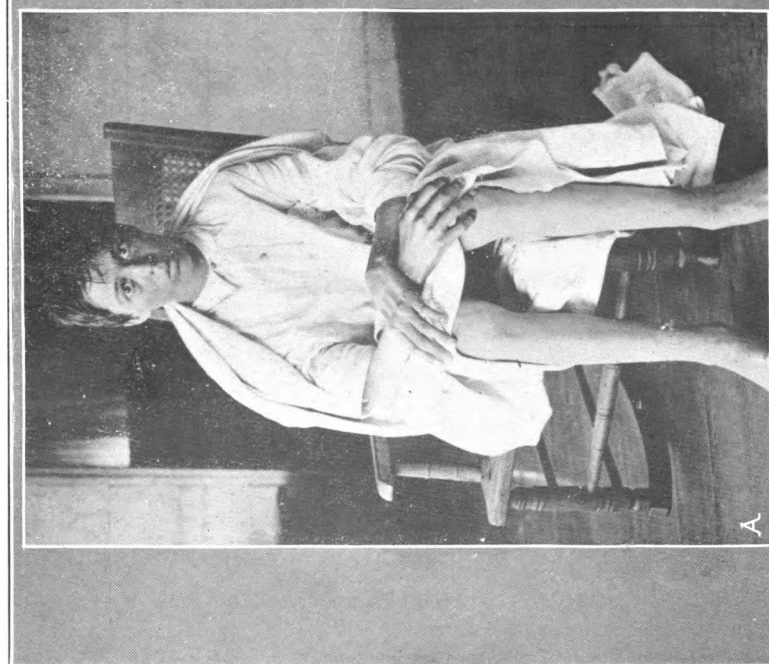


Fig. 22—Results of treatment. Earnest Sorrell, Weirton, Ga. a. Hospital case; dismissed after two treatments. b. Earnest Sorrell 14 months later. Has been doing hard work for twelve months.

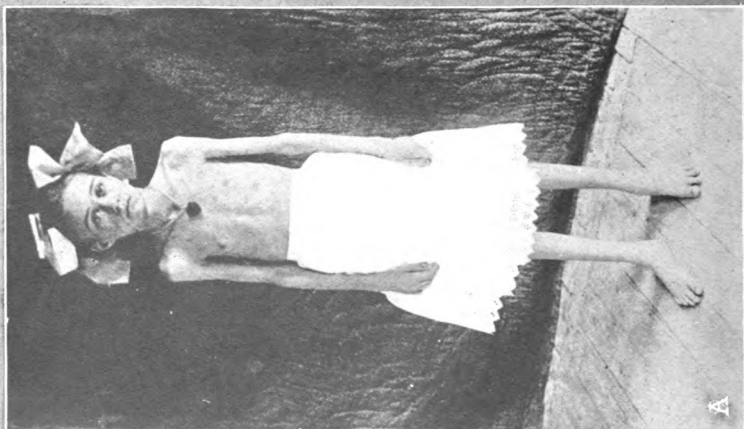


Fig. 23—Della Carder, Grant county, Arkansas; age 16; practically an invalid from childhood; had been treated for malaria and tuberculosis; found heavily infected with hookworms; treated. b. Della Carder as she is to-day.



Fig. 24—Lovett family, Chilton county, Alabama; all infected; all treated; marked improvement.



Fig. 25.—Results of treatment. Beevers family, Bently, La. All heavily infected. All treated with excellent results.

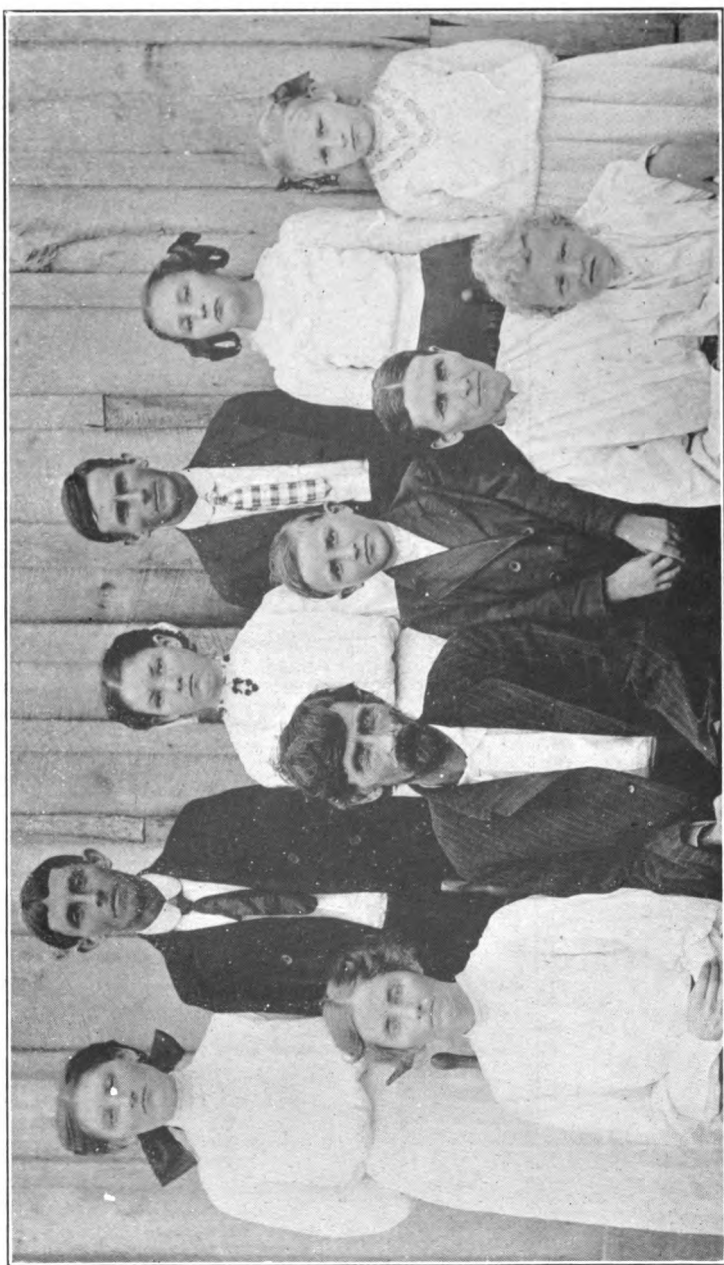


Fig. 26—Tennessee family; all infected; all cured with thymol; had spent \$1,500 for patent medicine.

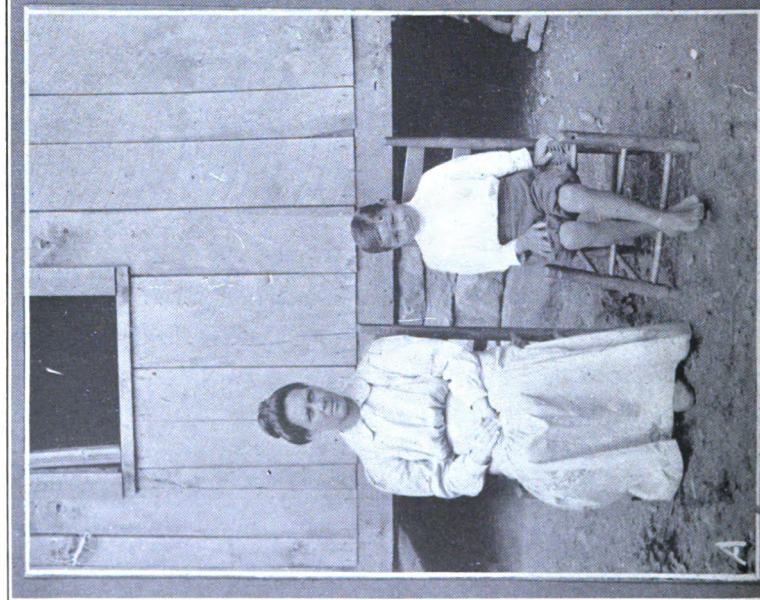


Fig. 27—Results of treatment. a. Mother and son (Ky.) who have hookworm disease and pellagra. Much improved after hookworm treatment. b. Father and three sons (Grant Parish, La.) have hookworm disease. Father has pellagra also. All greatly improved by three treatments with thymol.

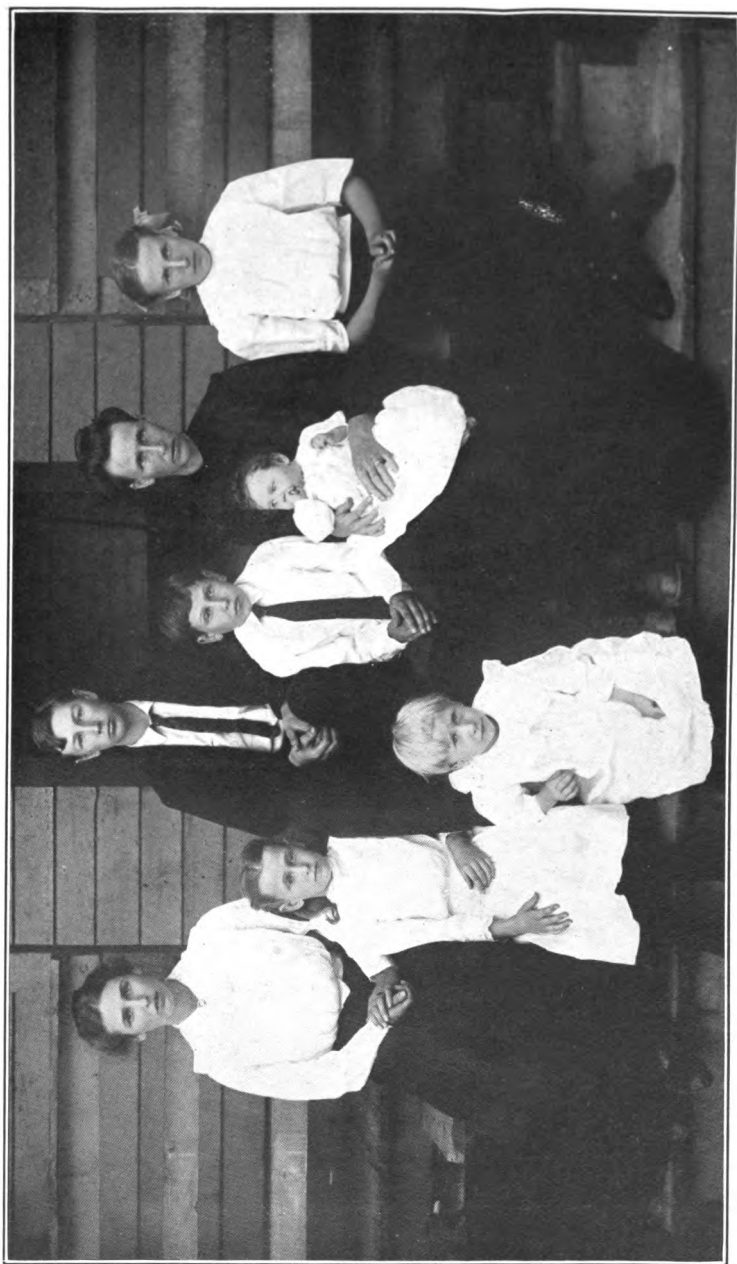


Fig. 28—South Carolina family. All were infected. All cured.

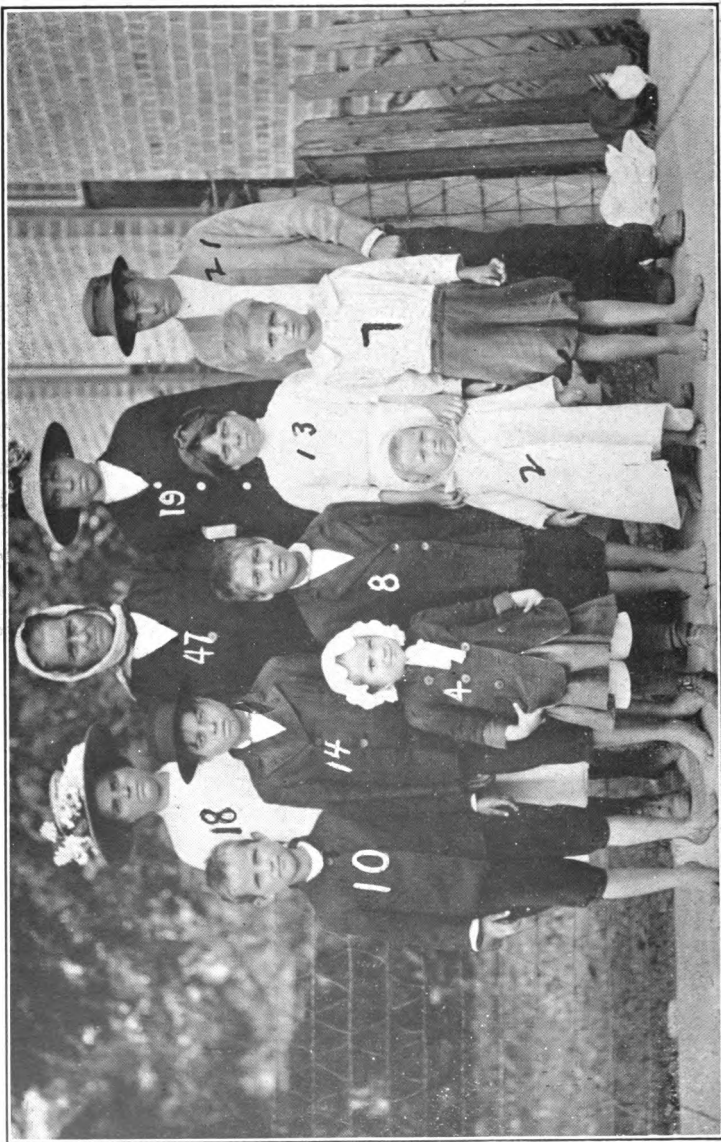


Fig. 29—Mrs. Louisa Pace and family, Mobile county, Alabama; had spent all the money they could get during the last few years for medicine, to no avail; own no home; could not pay rent; treated and cured. The figures indicate ages.

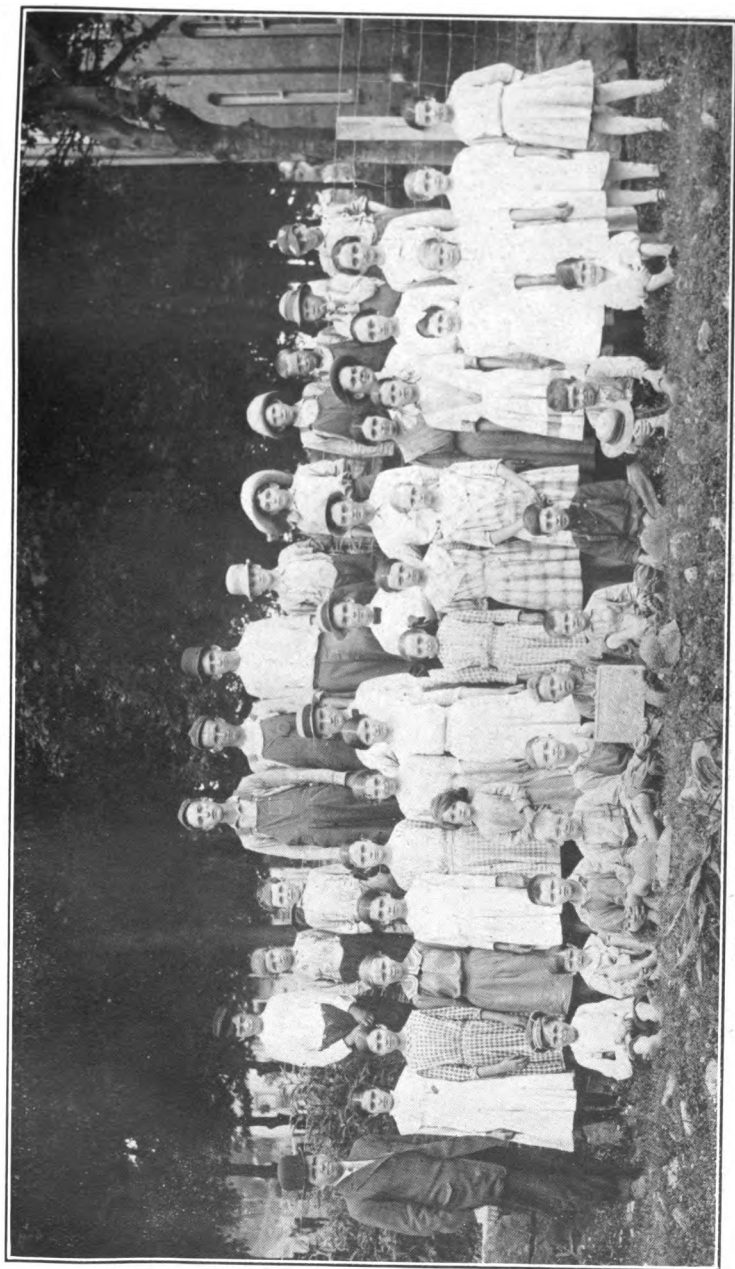


Fig. 30—A Kentucky school. Light infection. Treated and cured.

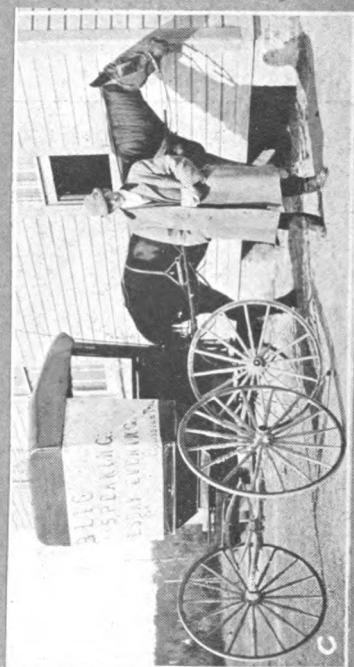
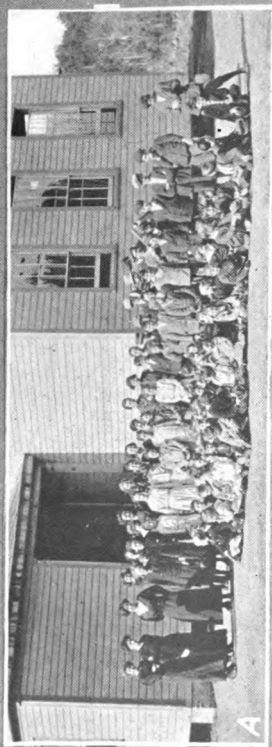


Fig. 31—a. and b. The two public schools on Knott's Island, Currituck Co., N. C. Every teacher and pupil examined. The infected ones treated until cured. Sanitary privies built. c. Dr. Maynard, the whole time community physician. Method of advertising a health meeting. See also Fig. 63.



Fig. 32—Dispensary group, Prentiss county, Miss.; waiting to get results of examination and to hear lecture on sanitation. Number examined in county in six weeks' campaign, 4,246.

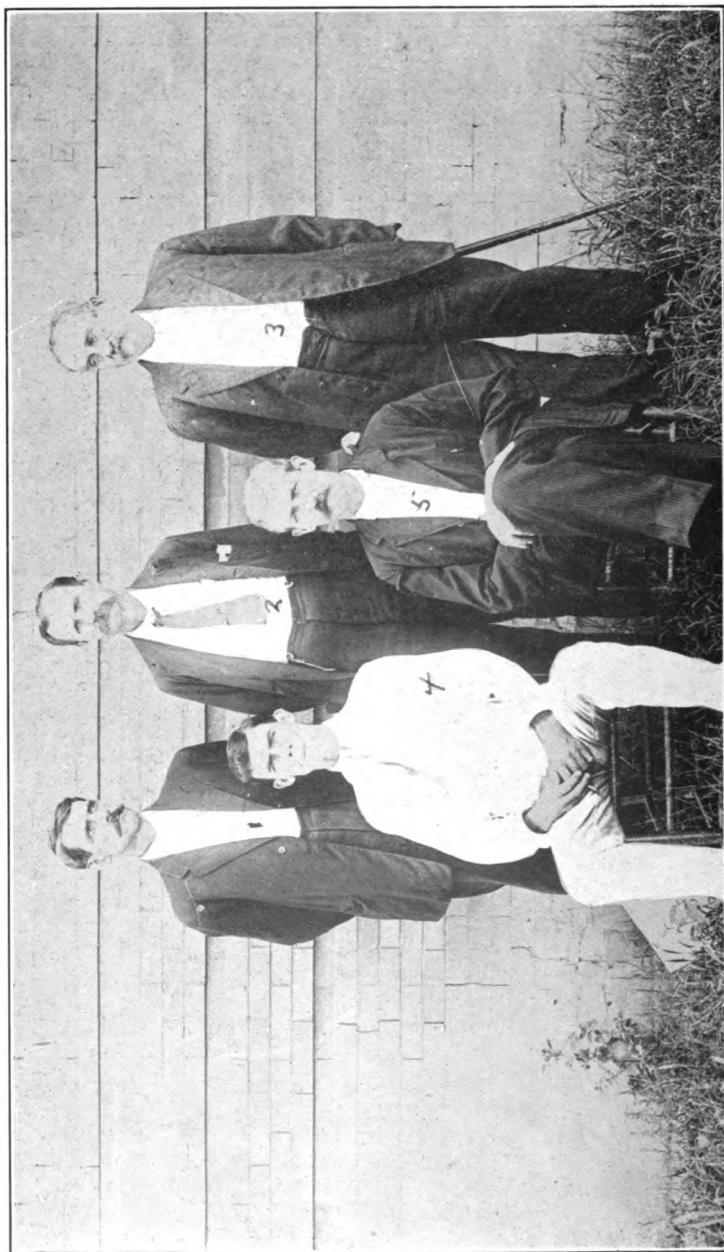


Fig. 33—Board of Supervisors, Prentiss Co., Miss., who appropriated \$249.92 for the county campaign. They also gave their personal time and influence to the work. 1. Ben Moreland. 2. John Green. 3. Babe Ellis. 4. R. B. Moore. 5. J. Miller, chairman. Number of county boards making appropriations, 457.



Fig. 34—Dispensary group, Carter county, Tenn. Number examined during six weeks' campaign 1,138; number treated, 537.

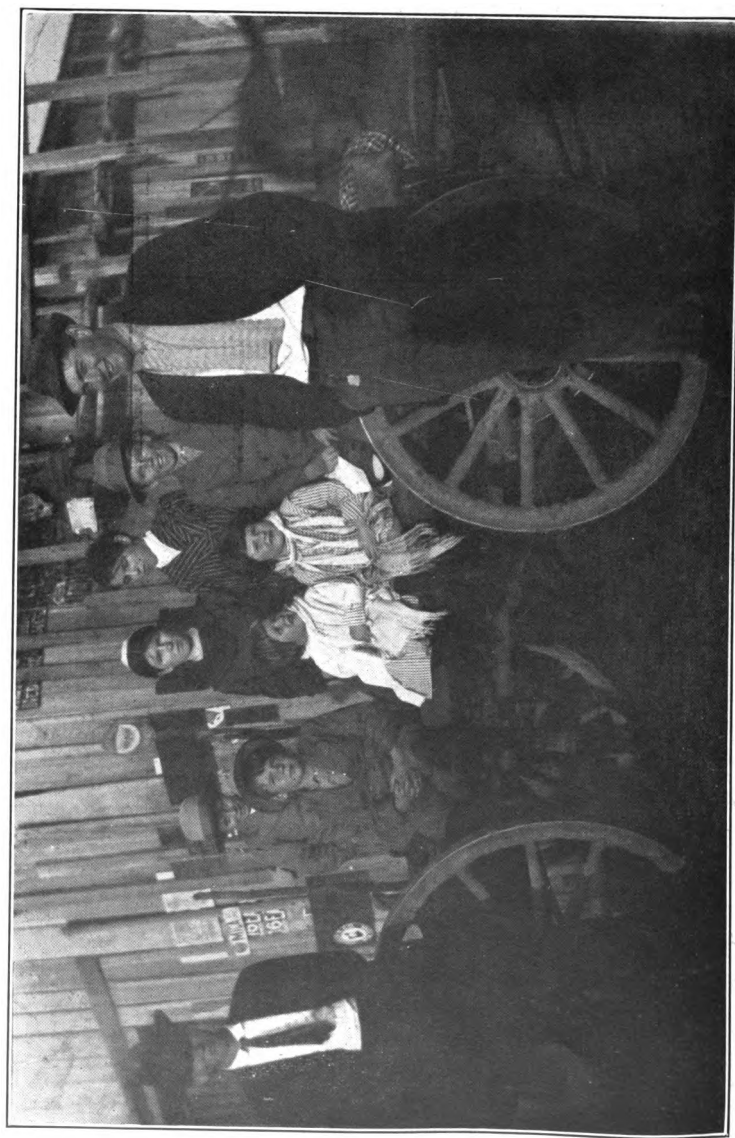


Fig. 35—Family of seven children drove 18 miles to dispensary. Choctaw Co., Ala. Number of persons treated in county, 1,285.



Fig. 36—Prentiss County Medical Society, Miss., and the Editor of the county paper. Every physician in the county aided in the work.

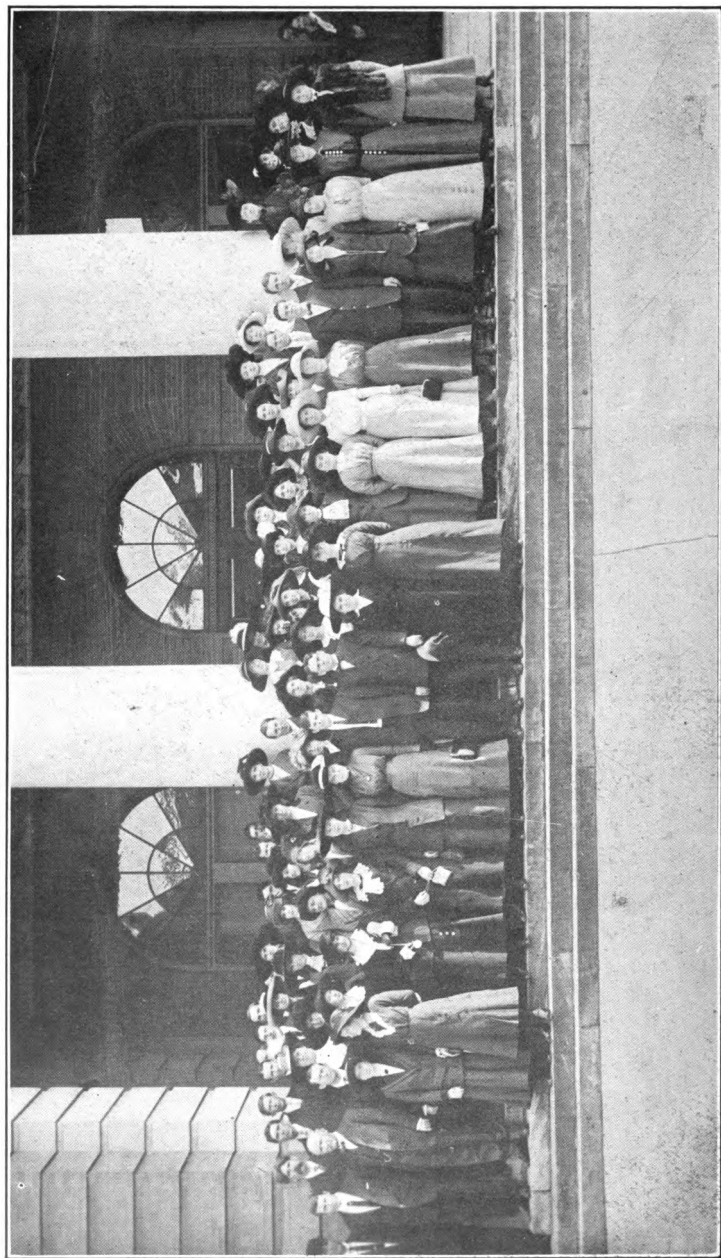


Fig. 37—The teachers of Lauderdale Co., Miss., who were particularly active in lending co-operation in the county dispensary campaign.

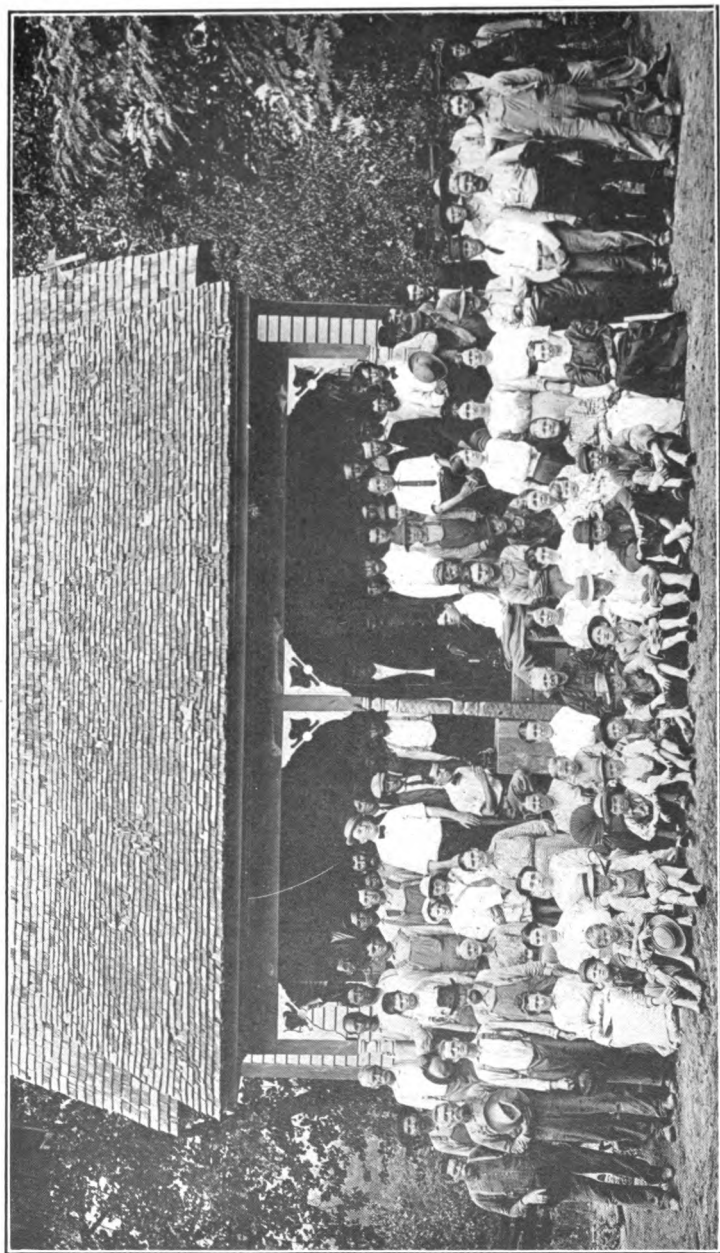


Fig. 38—Dispensary group at Dr. B. B. Smith's office, Prentiss Co., Miss.



Fig. 39—Dispensary group, Clanton, Chilton Co., Ala.; 102 patients treated on this day.



Fig. 40—Opening day, Colesville dispensary, Carter C o., Tenn. Number of persons in picture, 72; number infected, 56.

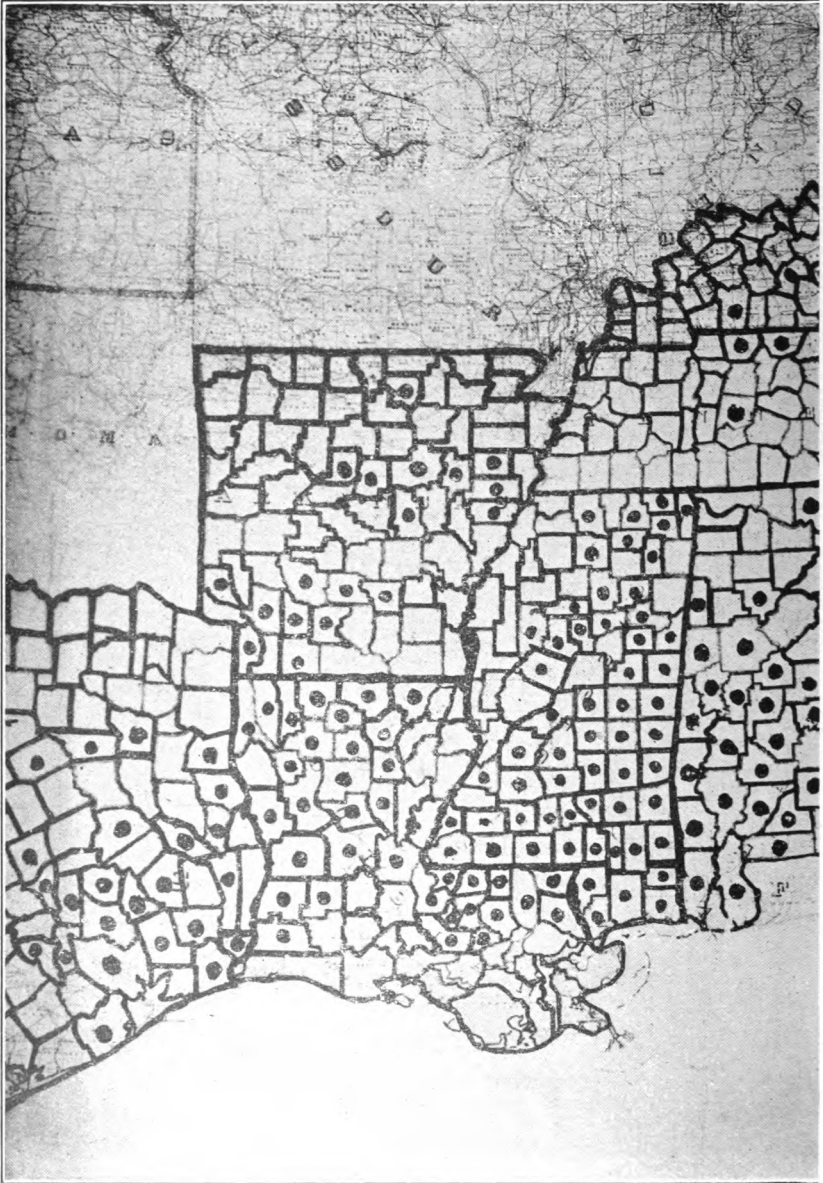


Fig. 41-42—Map shows States where county dispensaries have operated.



Number of counties in the eleven States, 1,142; work completed in 411.



Fig. 43—Dispensary group. Young's Chapel, Ben Hill Co., Ga.

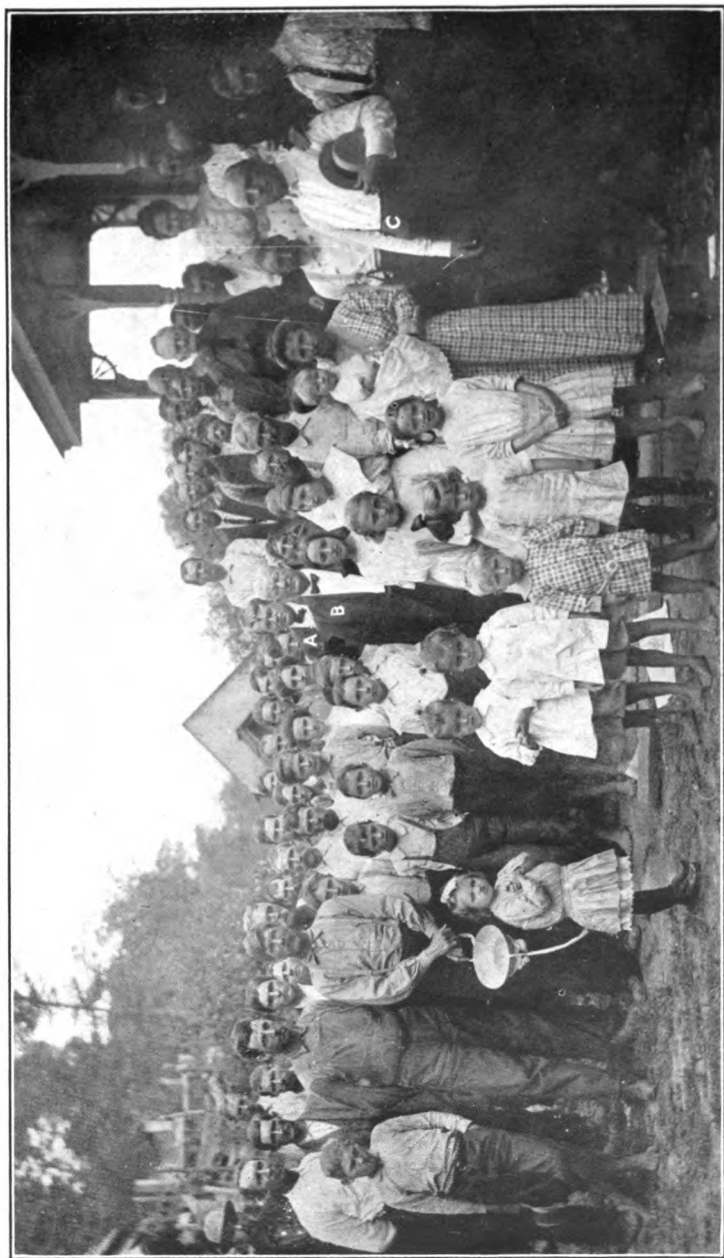


Fig. 44—Dispensary group, Knox county, Ky.; in the heart of the mountains; fourteen miles from railroad.
Number of persons examined in county, 3,230; number treated, 1,926.

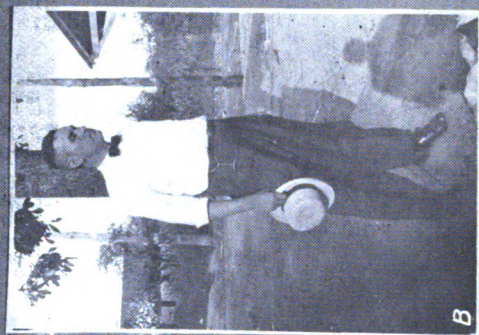
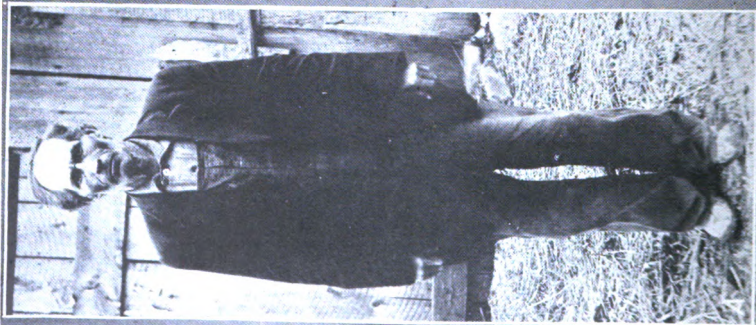


Fig. 45—Showing the co-operation of various agencies. a. Mr. W. R. McGaha, Cosby, Tenn., who collected and brought in specimens from two entire schools. b. Dr. Choate, who gave untiring assistance to the work in Rowan Co., N. C. c. Teachers at Naillon, Cocke Co., Tenn., who brought in specimens from every pupil in school. 75 per cent. infection found.

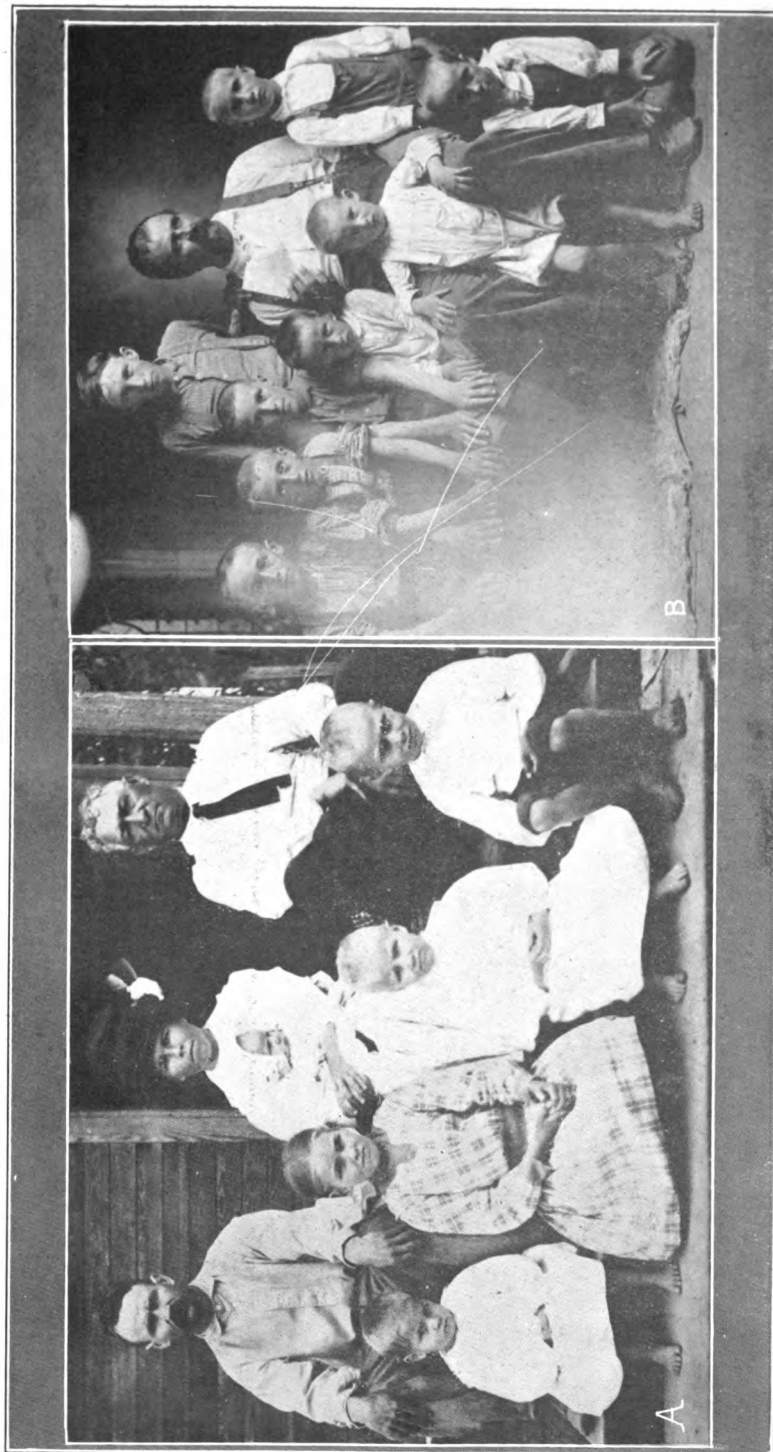


Fig. 46—Showing co-operation of various agencies. a. Dr. J. C. Bailey, Avera, Ga.; has brought in a family to be examined and treated; entire family infected. b. A gentleman of Hickman county, Tenn.; brought in his and his neighbors' boys fourteen miles to the dispensary.



Fig. 47—Teaching by demonstration. Field director demonstrating with a cigar box the essentials of a sanitary privy. Alabama.

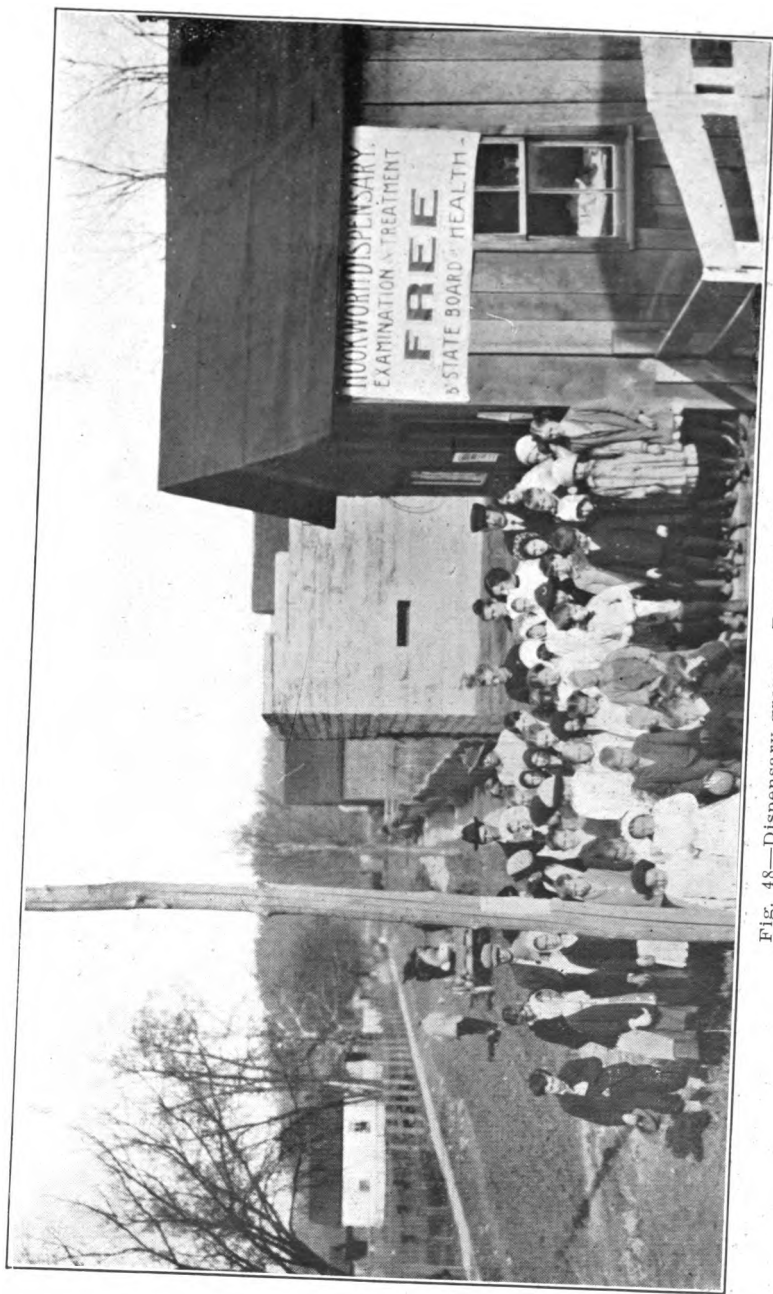


Fig. 48—Dispensary group. Farmers, Rowan Co., Ky.

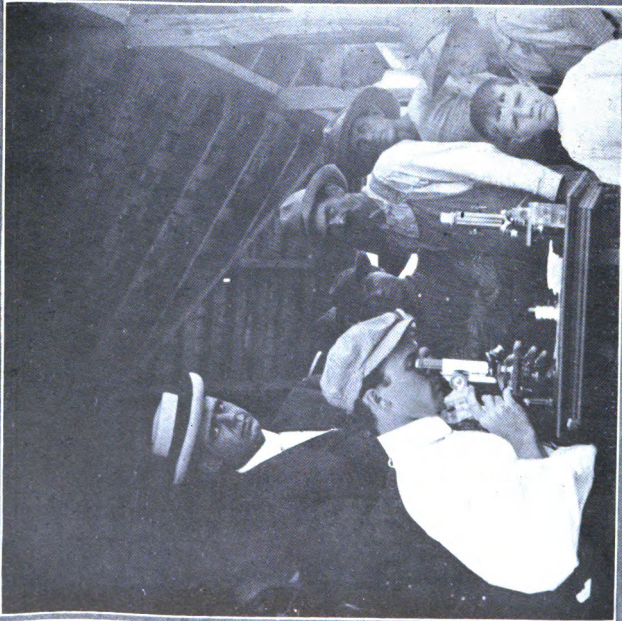


Fig. 49—The diagnosis of infection in all dispensary work is now based on a microscopic examination of the stool. a. Dispensary near Hamstead, Texas. b. Crowd around the microscopes, Jonesville, Va.

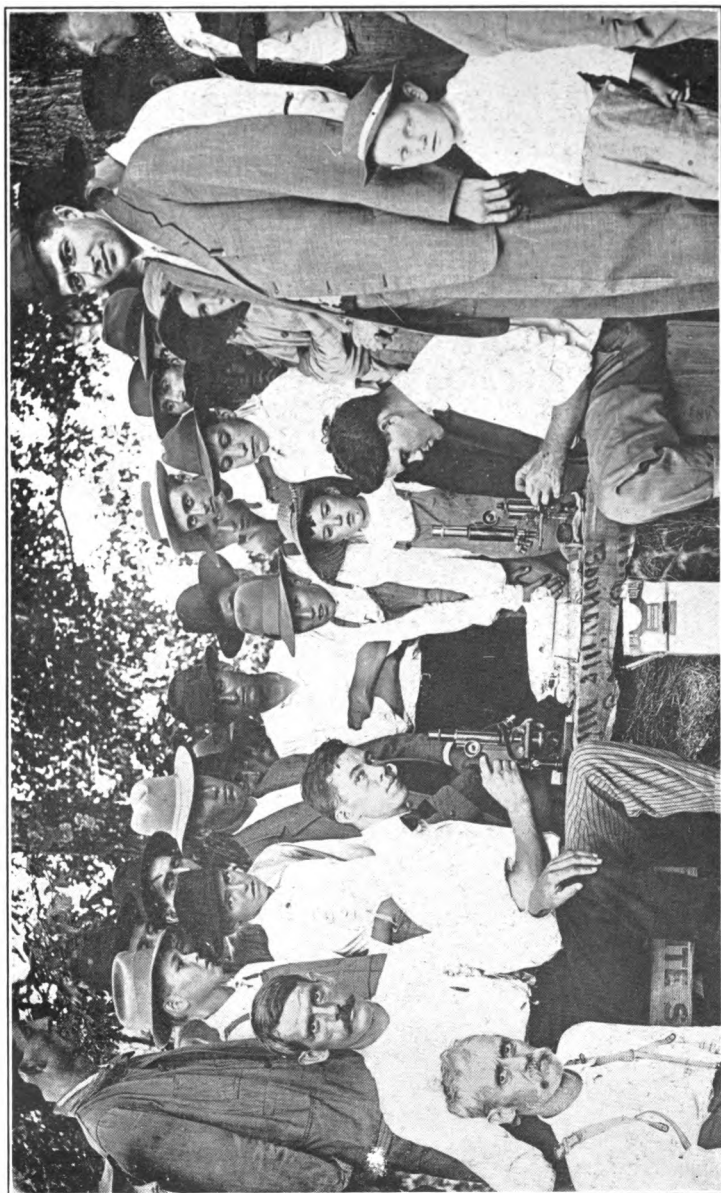


Fig. 50—Outdoor laboratory, Prentiss Co., Miss. On left (dark mustache) a county supervisor. 118 persons examined this day.

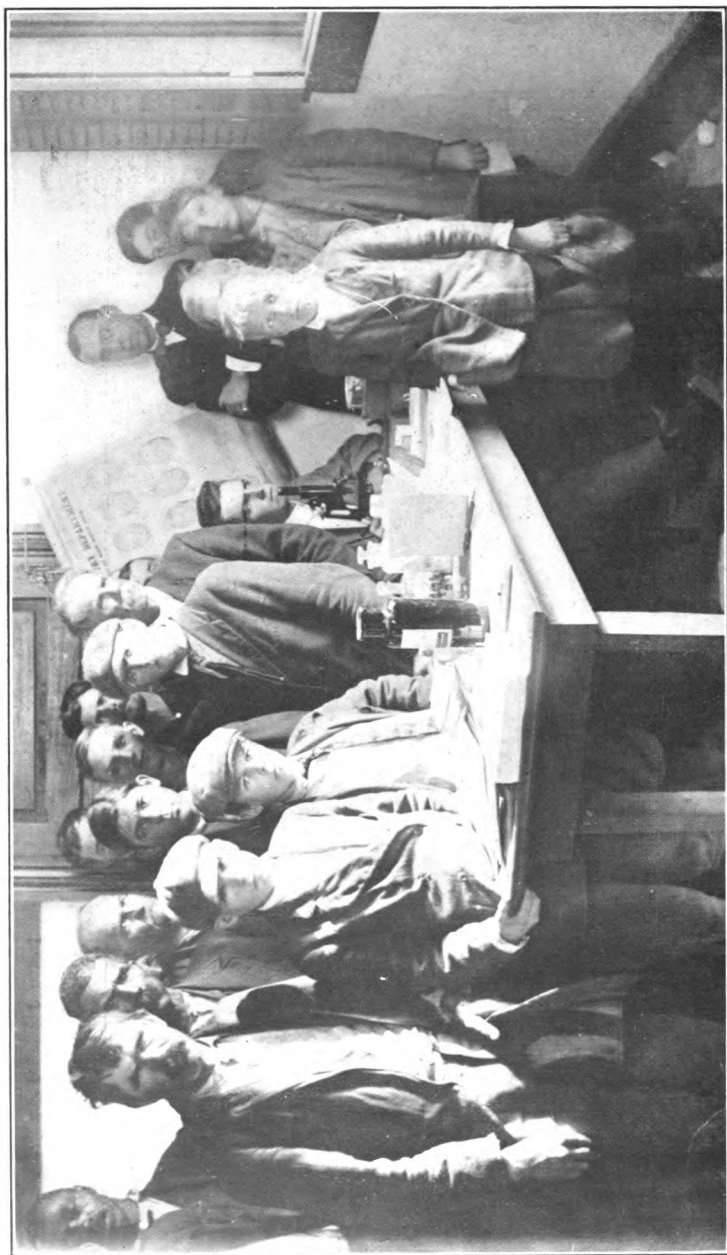


Fig. 51.—Dispensary. Lilesville, Anson Co., N. C. 182 persons examined here this day.

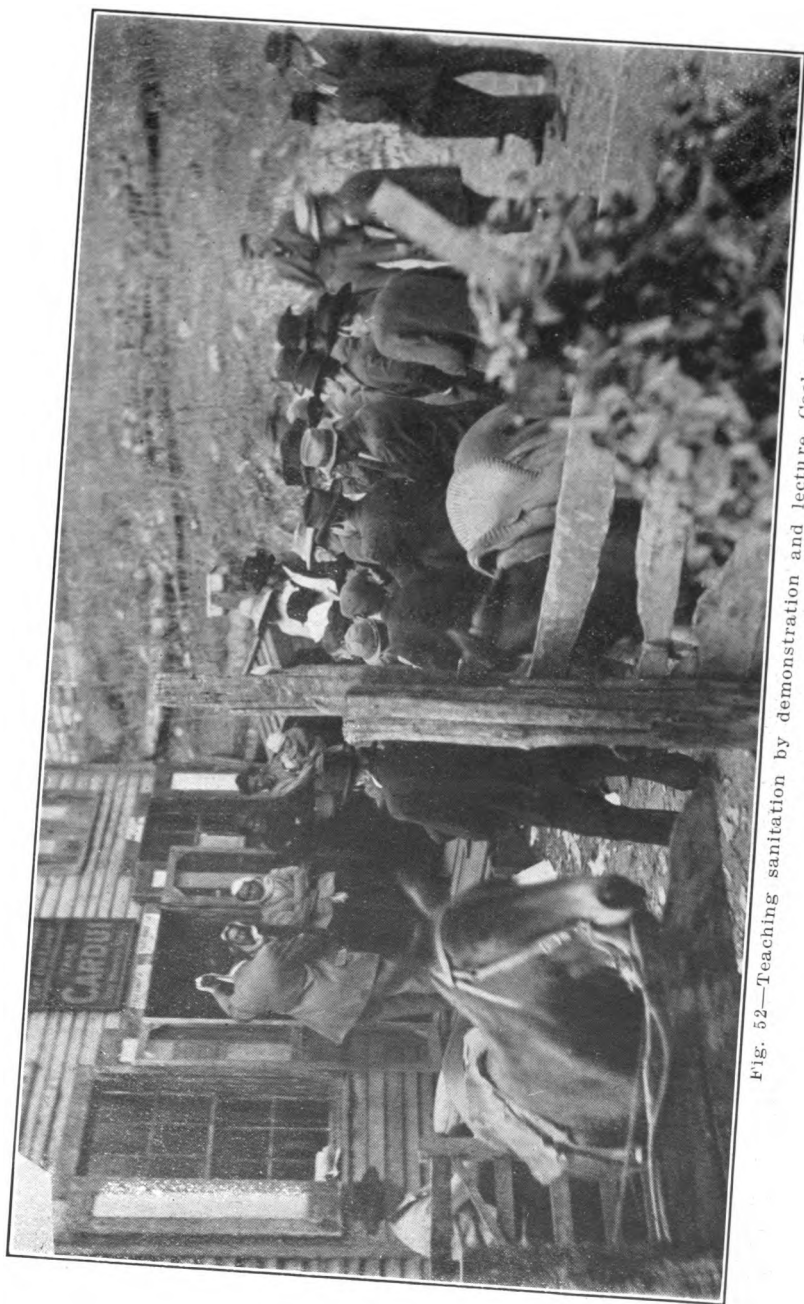


Fig. 52—Teaching sanitation by demonstration and lecture, Cocke Co., Tenn.

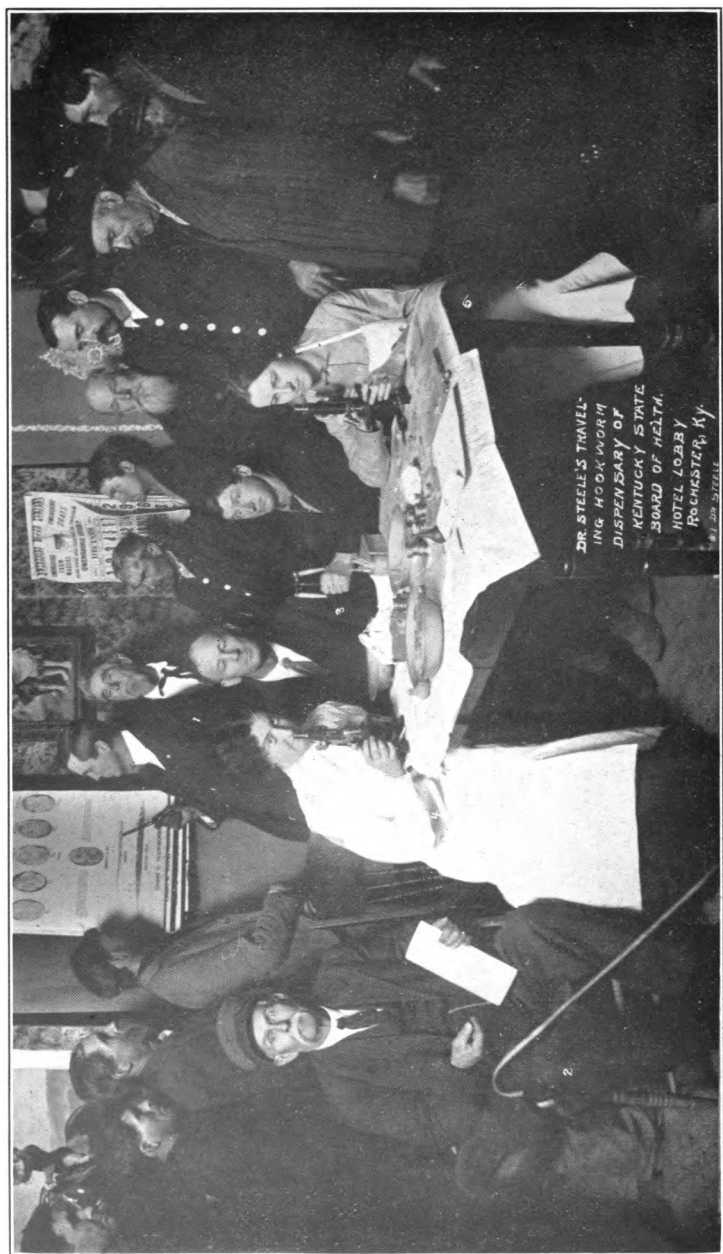


Fig. 53—Dispensary, Rochester, Butler Co., Ky. Practically every man, woman and child in the town and its immediate surroundings were examined. Young lady microscopists seated at table.

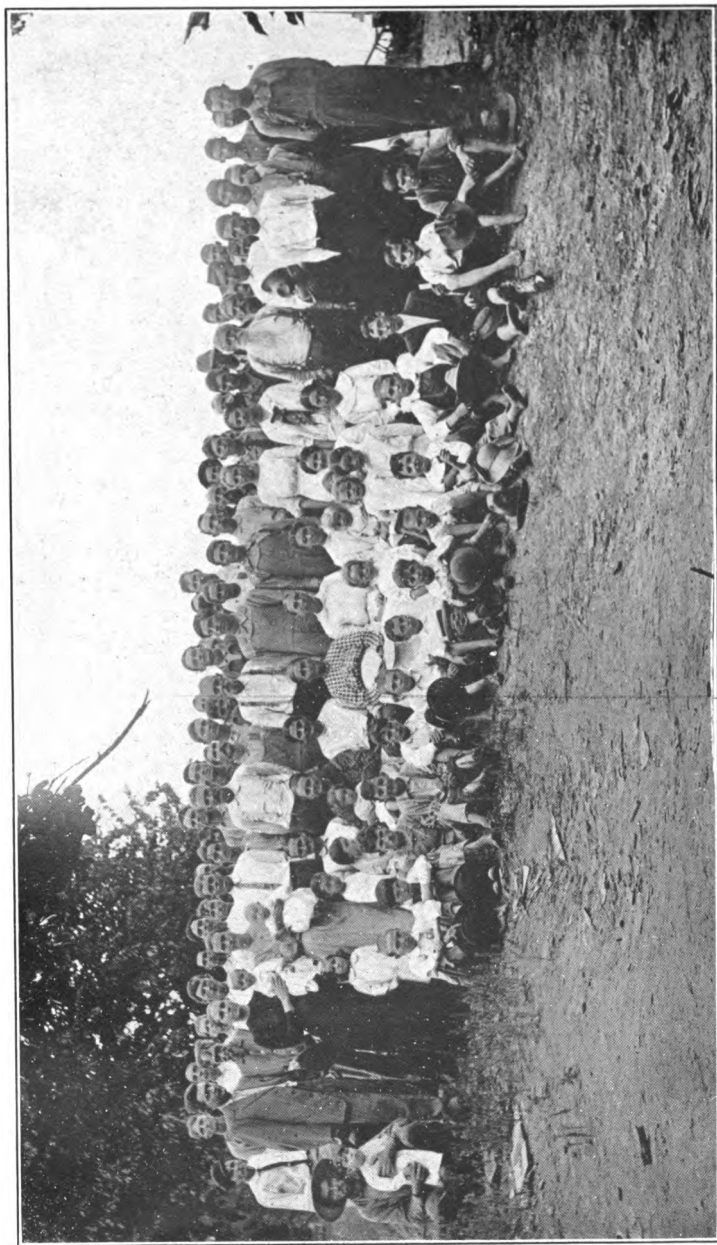
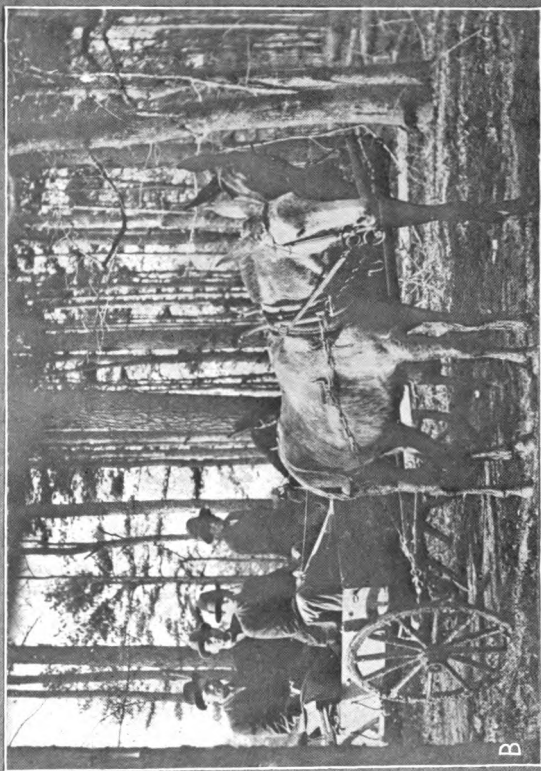


Fig. 54—Attending a dispensary lecture. Altitude, Prentiss Co., Miss. In this county an average of 198 persons were examined, each work day for six weeks. Number of persons treated, 1,433.



A



B

Fig. 55—The dispensary staff at lunch. a. Lee County, Va., where 9,013 persons, 45 per cent. of the total population, were examined in 24 dispensary days; 2,332 persons found infected and treated. b. Smith County, Miss. Dispensary staff traveling through northern part of county.

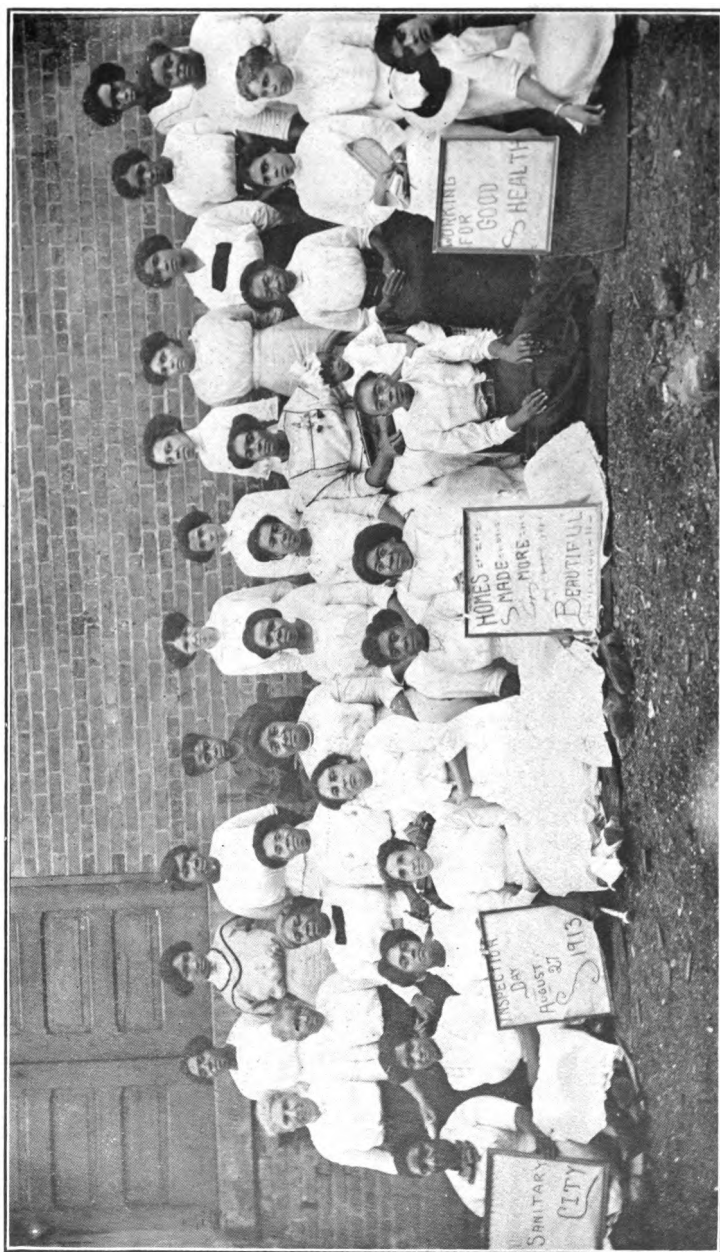


Fig. 56.—Clivic League of Colored Women, Salisbury, N. C. They have done excellent work in cleaning up the premises of the colored section of the city.

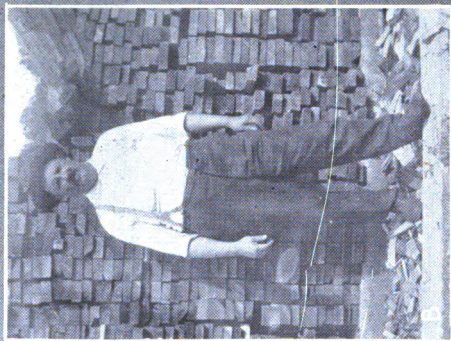


Fig. 57—Showing co-operation of various agencies, a. Mr. W. M. Lee, of Tallulah Falls, Ga., who distributed containers and collected specimens for his entire community. He brought in 31 specimens the first dispensary day. b. Mr. Ellis, Mitchell Co., N. C., active in getting his people to be examined and to build sanitary privies. c. (left) Dr. King, (right) Prof. Williams, active in aiding dispensary work at Lorena, Smith Co., Miss.

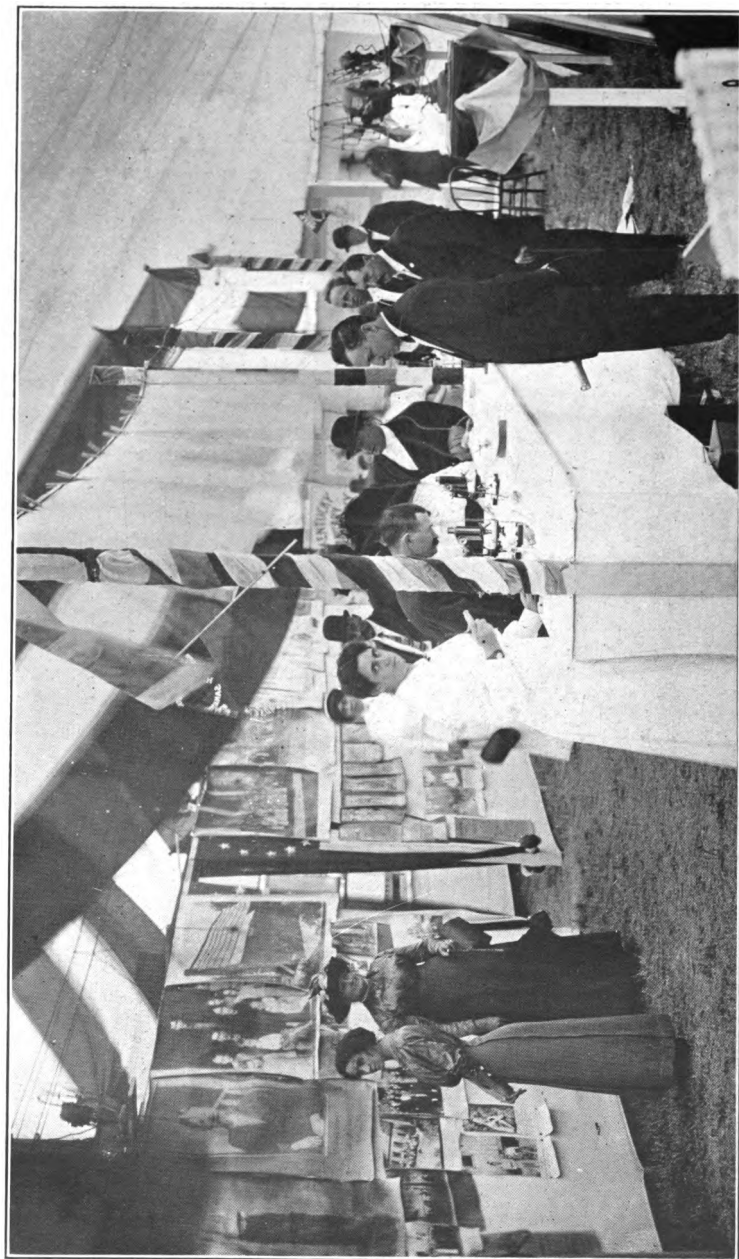


Fig. 58—Creating public sentiment. Exhibit Kentucky State Fair. Interior of tent showing methods for doing health work.

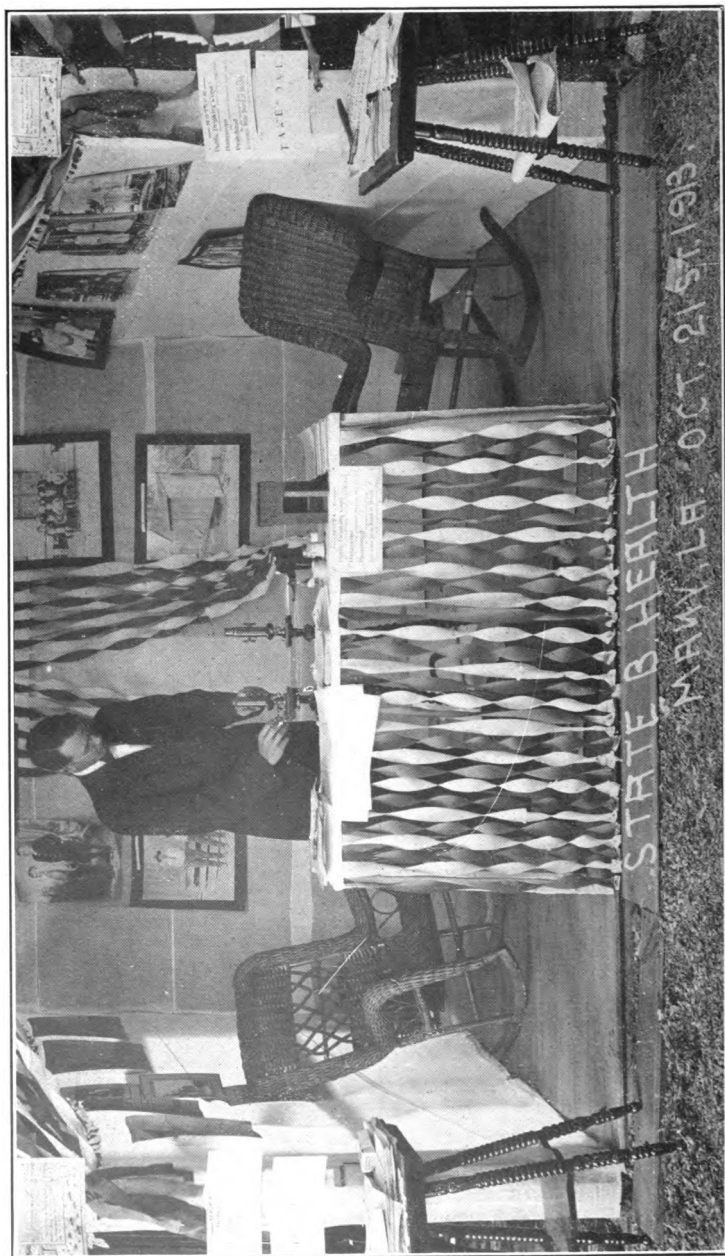


Fig. 59—Creating public sentiment. State Board of Health Exhibit. Many, La.

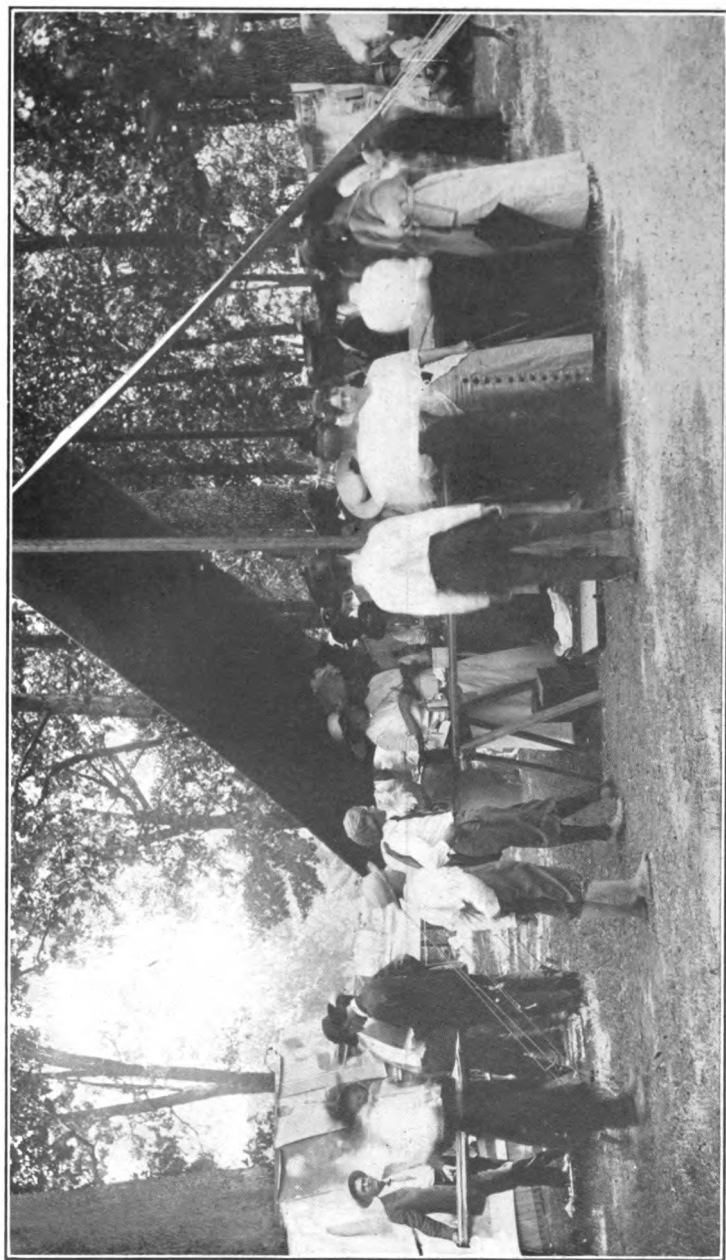


Fig. 60—Educating the public. Exhibit of the Kentucky health work at Farmers' Chautauqua in Warren Co. Exhibit includes specimens of intestinal parasites, hookworm eggs under the microscope, enlarged photographs of patients before and after treatment, etc.

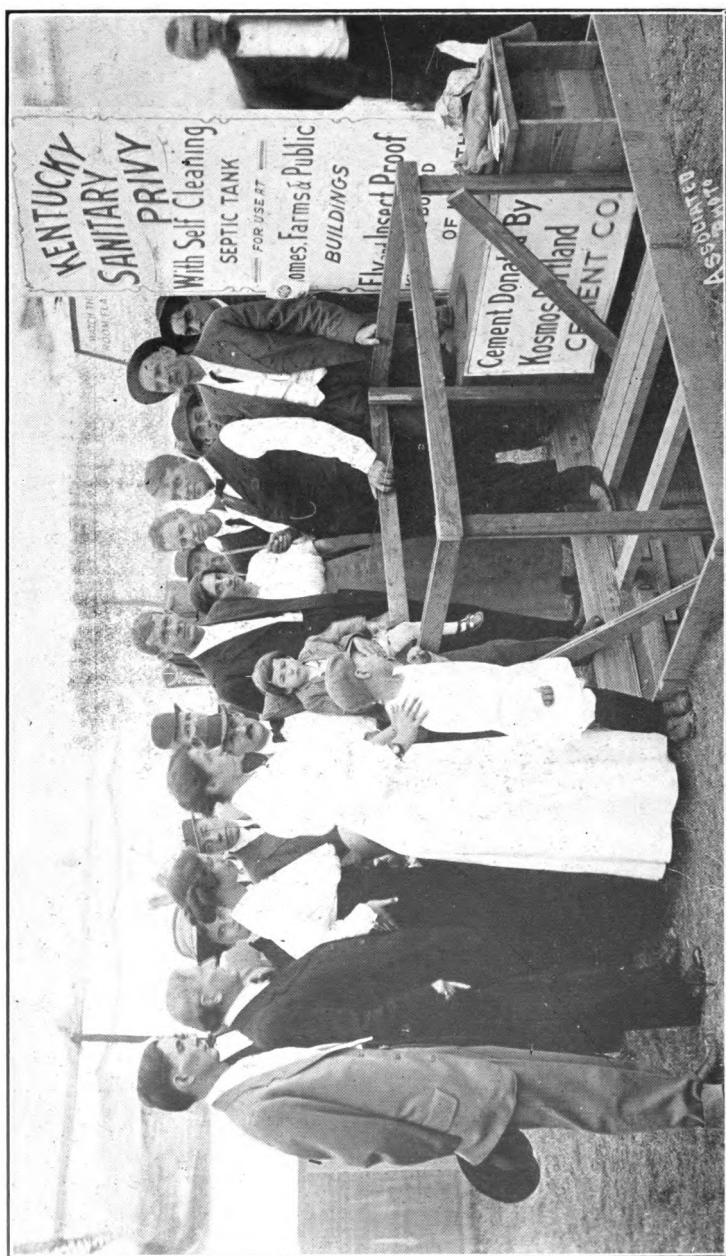


Fig. 61—Dr. J. N. McCormack (shirt sleeves) demonstrating the Kentucky sanitary privy. About 12,000 people saw this model in course of construction.



Fig. 62—The Governor and his staff with Kentucky State Board of Health force making official inspection. This exhibit met with the Governor's enthusiastic approval.

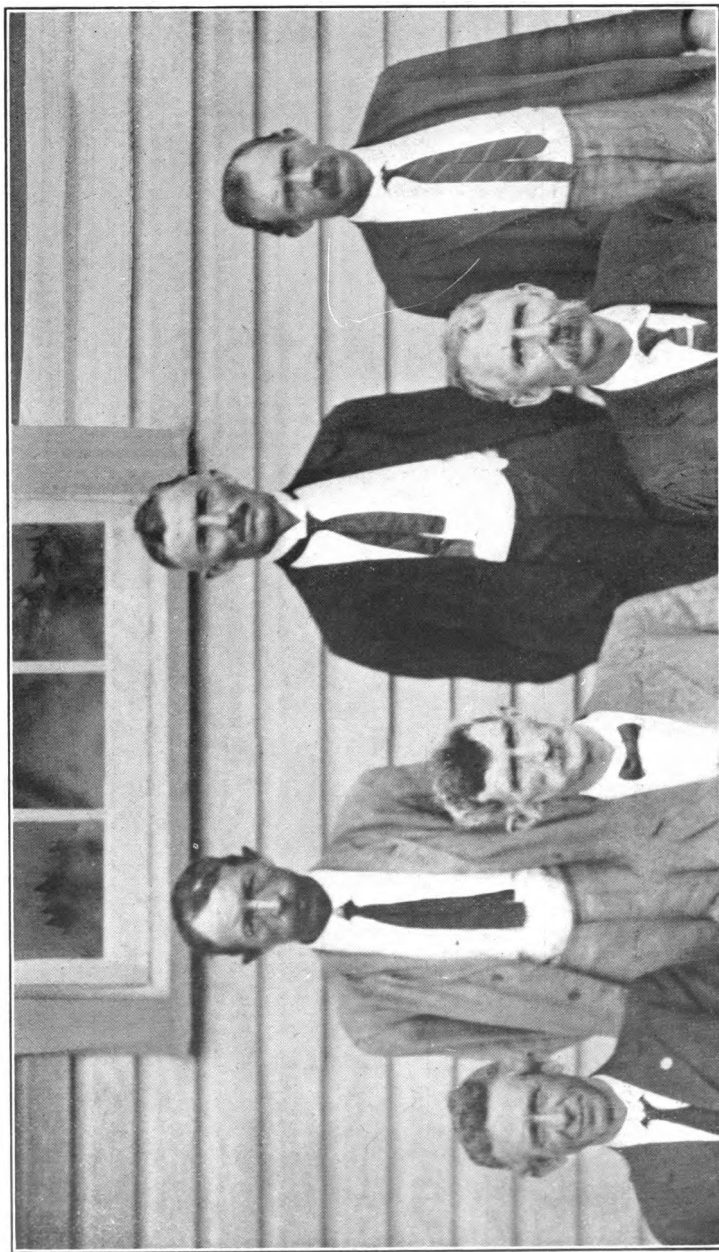


Fig. 63—Knott's Island, N. C. To the left is the Sunday-school Superintendent, to the right the Singing Master. The men in the center are members of the Knott's Island Health Committee, composed of five members, selected in mass-meeting. The Committee employs a community physician for his entire time to keep them well, but if sickness occurs, he gives it attention. Each family, sick or well, pays a pro rata assessment. 567 persons—130 families live on the island. On December 23, 1913, 560 of them had been examined for hookworm infection; 94 were found infected, and 90 have been cured. See Fig. 31.

CHAPTER IV.

A FEW TYPICAL LETTERS AND EXTRACTS FROM LETTERS SHOWING THE CO-OPERATION OF VARIOUS AGENCIES, AND THE ATTITUDE OF THE PEOPLE TOWARD THE WORK.

I. Letters and extracts from letters by physicians.

(1) *Dr. Grote, Field Director, to Dr. Dinsmore, State Director, Ala.*—"Dr. Miller of Myrtlewood came all the way from his home place, a distance of eighteen miles over muddy roads, through the rain, and brought thirteen specimens from his patients, all of whom were infected. Drs. Stone and Brasfield have both attended the clinics to-day."

(2) *J. P. Masterson, M. D., Bessmay, Tex.*—"My dear Doctor: Your commission has just closed operations in Jasper County, and to say that it has done great good, and has been a grand success, would express it only mildly. The money appropriated by our county does not in any way compare with the great good that has been done for the county at large, and even the worth it has been to just one individual infected with hookworm disease. It has enabled and encouraged numbers to be examined and treated, that otherwise would not or could not have been."

II. Letters and extracts from letters by county health officers.

(1) *Karl Chambers, M. D., County Health Officer, Jasper, Jasper County, Texas.*—"Dear Doctor: Over and above the 1,133 treatments dispensed here, the campaign was worth thousands of dollars to the county in an educational way, for the people now realize that improving insanitary environment is imperative. The campaign in this county has received

hearty commendation from every man, woman and child so far as I personally know, and I feel sure that the results obtained warrant all the praise given."

(2) *Dr. W. S. Leathers, Jackson, Miss.*—"Dr. Whitfield on entering Smith County obtained the aid of Dr. Carr, the County Health Officer, on a three weeks trip through the county. This was done at the suggestion of Dr. Carr and at his expense. The County Superintendent of Education used every possible means to enlist the interest of the teachers and children of the schools. This is one of the interior counties and a feature of the work was the unanimous support of the Board of Supervisors. This was clearly shown by obtaining a second appropriation for the campaign without any difficulty."

(3) *V. J. Cragg, County Health Officer, Clanton, Ala.*—"Dear Doctor: The work here has been a great success from every point of view, and I am quite sure that there was a much higher per cent. of infection in this county than was even dreamed of by the majority of the profession, not to speak of the matter from the standpoint of the laity. I feel that much good has been done by teaching the laity the very important matter of prevention as well as the work of treating the patients, who are at present infected."

(4) *Dr. M. H. Boerner, State Director, Texas, to Wickliffe Rose, Washington, D. C.*—"Dear Mr. Rose: I am enclosing you herewith a plan for grading thirty-five schools in Brown County. They are contesting for the One Hundred Dollar Sanitary Prize, offered by Dr. J. W. McCarver for the school that attains the highest grading."

(Type of Plan Followed to Improve School Sanitation.)

TO THE PUBLIC

To become an effective instrument for the protection of child-health, it is essential that the school should be a sanitary and healthful place for children. Recognizing the importance of this broader humanistic responsibility of education, it has been thought wise to inaugurate a clean-up campaign among the schools of Brown County, and through the generosity of Dr. J. W. McCarver, our county health officer, and Mrs. S. R. Coggin, former president of Coggin National Bank, a prize of one hundred dollars is to be awarded the most sanitary school. Dr. McCarver offers \$50.00 in cash to be expended in any way it suits the winners, and Mrs. Coggin donates \$50.00 for books for school library and periodicals.

Every school in Brown County (outside of Brownwood) is eligible for entry; those interested will please mail a card to the county superintendent by March 1st.

The humblest, most unattractive school house will stand an equal chance with the newest and prettiest, as the matter of beauty will not be considered and the judges will grade all schools on a sanitary basis alone. The following points will be considered, each of the four headings being worth 25 per cent.

1. House—Ventilation, cleanliness, state of repair.
2. Grounds—Drainage, trees, provision for healthful sports, rubbish, etc.
3. Water—Source, container and cups, freedom from pollution.
4. Toilets—See or write to Dr. J. W. McCarver for particulars.

This contest will close the last day of March, 1913, and judges will begin inspection on March 15th. The time is short, so let teachers, trustees, mother's clubs, fathers, sisters, brothers, uncles, aunts, and cousins lend the children a helping hand in this great work. Let this clean-up movement be the greatest trust ever organized in Brown County; its dividends may not be counted in dollars and cents alone, but in brighter faces, rosier cheeks, keener intellects and happier co-workers with our Maker in the progress of civilization.

(Signed)

MRS. E. L. WALKER.

III. Letters from High Officials.

Hon. Earl Brewer, Governor—To the People of Mississippi:

The importance of the laws of Sanitation and Hygiene is now being brought to the attention of our people as never before. The School Improvement Association, under our State Department of Education, and State Board of Health, are doing their utmost to educate our people on this subject. Particularly are our children being taught the necessity of clean living, and those rules which if followed, will give them immunity from so many of those diseases which interfere with their work at school, and cause ill health in maturer years.

The School Improvement Association has issued a program to be observed in all our public schools, and I most heartily commend it.

To emphasize the importance of this question and show my interest in it, and in order that it may be brought to the attention of our people, I do issue this

PROCLAMATION

calling on them to observe Friday, October the Thirty-first, 1913, as HEALTH DAY, and on this day that their energies be redoubled, and their faculties brightened so as to acquire that definite knowledge which is necessary for better health and better living.

THE
GREAT SEAL
OF THE
STATE OF
MISSISSIPPI

IN TESTIMONY WHEREOF I HAVE HEREUNTO SET MY
HAND AND CAUSED THE GREAT SEAL OF THE STATE
OF MISSISSIPPI TO BE AFFIXED, THIS, THE THIR-
TEENTH DAY OF SEPTEMBER, A. D. 1913.

(Signed) EARL BREWER.

BY THE GOVERNOR
JOSEPH W. POWER,
Secretary of State.

(2) *Jas. K. Vardaman, U. S. Senator from Mississippi.*—
“Dear Doctor: I think the State of Mississippi is to be congratulated upon the great work that you and your co-laborers are doing in the interest of health and sanitation. If I had been told some years ago that hookworm was so prevalent in Mississippi, I could not have believed it. The disease has done a great deal of damage, and those engaged in exterminating it deserve the gratitude of all men. The same thing is true with reference to pellagra, tuberculosis, typhoid fever, and in matters of general sanitation.

If I can be of any assistance to you in this great undertaking please command me.”

To Dr. W. S. Leathers.

IV. Letters and extracts from letters by teachers.

(1) *Edward F. Green, President Carolina Collegiate and Agricultural Institute, Star, N. C.*—“Dear Doctor Pridgen: Permit me to say that the examination showed 47% of our students were troubled by the Hookworm pest. There had been a noticeable lack of interest both in play and in the studies on the part of a goodly number of the students. The treatment given by Dr. Covington was marked, and to a noticeable degree even on the part of people not watching the effect of the treatment closely. In the classroom the improvement was very perceptible in the growing interest in the work, and the grip the students got on their studies. The pallor went from the faces, and there was a manifest desire to take part in the games on the playground after the treatment. It was a rejuvenation in a very real sense.”

(2) *Exhibits from two institutions showing difference in efficiency which seems to have been caused by a light infection:*

(a) Blue Mountain Female College:

Average grade of 56 girls who were found infected.	77.75%
Average grade of 56 girls taken at random not infected.....	89.28%
Of two sisters in this college, grade of one infected.	78 %
Grade of other not infected.....	87 %

(b) Mississippi Heights Academy:

5 young men not infected (ages 20 to 28), average grade.....	92.2 %
5 young men infected, average grade.....	89.8 %
5 boys not infected (ages 12 to 17), average grade.	84.2 %
5 boys infected, average grade.....	81.0 %
25 men and boys not infected, average grade....	86.0 %
25 men and boys infected, average grade.....	64.0 %

3. *Examination of Students at the A. & M. College, Mississippi.*—At A. & M. College, Mississippi, 819 students were examined for hookworm infection, of whom 323, or 39% were found infected. An examination of those students coming from sandy counties showed 69% infection. A series of 625 of these students showed only one athlete infected; an examination of the 144 officers showed only five infected.

Twenty-five men, five feet ten inches tall, not infected, averaged in weight 156 pounds; twenty-five men, five feet ten inches tall, infected, averaged in weight 147 pounds.

Of the twenty-five not infected:

- 5 made an average of 90 and above
- 11 made an average of 85
- 5 made an average of 80
- 3 made an average of 75
- 1 made an average of 65

Of the twenty-five infected:

- 0 made an average of 90
- 11 made an average of 75
- 2 made an average of 85
- 3 made an average of 80
- 9 made below 75

V. Description of Work by Field Directors.

(1) *Dr. J. S. Lock, Field Director, Williamsburg, Ky., to Dr. McCormack, May 13, 1913.*—"Dear Doctor: This has been the banner day in my dispensary work. We have had a total of 881 specimens brought in. The entire county is greatly aroused. Every county official, including the magistrates from the different sections, have been present all day aiding in the work. Every doctor in town was out, and gave the entire day to the work. We worked on the court house lawn, and fully 25,000 people were present during the day. The people said we had as large a crowd as they had ever seen in the town on any occasion."

(2) *Dr. Lock, Field Director, From Bush, Laurel County, Ky., July 11, 1913.*—"After all the specimens were in to-day, we made our count, and found that we had examined 328 specimens, and that we had 1,359 specimens (a total of 1,687) to send to the laboratory."

NOTE—This is the record for the largest number of specimens brought into a dispensary for any one day. 6,381 per-

sons were examined in Laurel County, Ky., in twenty-one days.

(3) *Dr. Henry Boswell, Field Director to Dr. W. S. Leathers, State Director, Miss.*—"Dear Doctor: I have just finished the work in Prentiss County. We examined about one-third the total population. I have not before seen such interest manifested, nor more permanent results obtained.

"The co-operation was excellent. The county officials gave their influence and time to promote the work. The Chancery Clerk attended to the central office work throughout the preliminary campaign.

"At one dispensary three small boys came each week two or three miles. They always rode three little bulls, which seemed to saddle very well and to attract much attention.

"At Thrasher, the co-operation of one woman was noteworthy. She combatted disbelief and prejudice in her community. In phoning one morning for 25 specimen containers to distribute, she said: 'I succeeded in getting one of these fellows to have examination made and to take treatment. He is feeling better and has gained in weight. Now that the people have seen that the medicine did not leave him blind or crippled, but is actually helping him, they are wanting to be examined.' The woman was instrumental in having about one hundred persons examined.

"A young man that we treated furnished us the best recommendation that we could have had. He came to the office about the third week looking as if he had the worst case of tuberculosis, and with a cough that appeared serious. He was such a picture of dejection, misery, and lost hope, that he attracted the attention of the whole court house crowd and many of them watched eagerly to see the results of the examination. One man asked me, after he left, if I could cure

him, and I replied that we would do our best. This man then kindly stated that he thought that I was doing the boy an actual wrong by holding out a hope, as it was his belief that the boy would die in a very short time. This boy was instructed to return every week for his treatment until informed that he was cured. He did; and it was a standing request by the court-house officials that they be called each week as Willie Livingston came in, so that they could see for themselves whether he was improving or not. On his first trip, one week later, he came in, and there was evidence of much improvement. He came in with a smile, showing more interest in things around, telling jokes to fellows in the office, when just one week before he had stood listless without a word to anyone except to answer yes or no when a question was put to him. He informed us that on this trip, although he had taken his medicine only a week ago, he was feeling a great deal better, and when placed on the scales, I found that he had gained a number of pounds in weight. He was given three treatments, one week apart, and after waiting two weeks following the third treatment, he was found free from infection, and weighed eighteen pounds more than he did previous to the first treatment. On the day that he first appeared at the dispensary he could hardly walk, and the last time that I saw him he started with another boy to walk seven miles to his home. As he left the Chancery Clerk said, 'Well, if you had done nothing but treat this one boy of this county, the money would have been well spent.'

"Another man, a Mr. Chase, came up and thanked me saying: 'I have lost two boys, and the others had begun going down in health, just as they did, but thank God, they will be saved, because you have told me what the trouble is, and have cured them.'

"As I closed the office on leaving for the next county, a mem-

ber of the Board of Supervisors came by and said that if I would stay in that county they would double the appropriation, that nothing they had ever done had accomplished the good of this work, and that it was a work that was appreciated by every citizen of the county.

"It might be mentioned that some school buildings were repaired, sanitary conveniences provided, and likewise the sanitation of the entire county improved.

"Trusting that I may be able to do as good work in the next county, I am."

(4) *Dr. M. W. Steele, Field Director, Kentucky, to Dr. A. T. McCormack, State Director.*—"Dear Doctor: I have just closed the campaign in McCreary County with 5,252 examinations. This campaign has been one of unusual interest and has been very successful in every particular. We have found the hookworm infection about 57%. One locality about Buzzard Post Office showed 91% infection. The roundworm infection has been very high; found the usual number of cases of whipworm and dwarf tape worm. Practically all cases of infection have been treated with splendid results. The results in some cases have been almost miraculous.

"One good old lady was interested to take containers and go among the shy girls, and secure specimens and bring them in, and she would in turn deliver the treatments and give instructions. The results have been so splendid that I cannot picture to you how grateful the people are. People throughout the country hearing of our work came from all sections to know about the good work, and to be examined. The demand became so great for a county wide campaign that it became almost compulsory upon me.

"Mr. W. B. Creekmore came from Pine Knot and proposed to do anything in his power to help us, insisting that his people

must have the benefit of the work. Then came Mr. Walker and Dr. Cain from Cumberland Falls, and others proposing to bear any part of the expense necessary.

"Messages were sent to the State Board pleading for a continuation of the work. I proposed if the Fiscal Court would bear the expenses of my assistants while in the county, that I would comply with the requests; but what about this matter. At that time there was a contest on for the judgeship and a bitter feeling existed in some sections. The county seat question was being hotly contested, but everybody wanted our work to go on; in fact, they would not let us leave. One claimant to the judgeship with four of the six magistrates met and allowed a fund for the expense. The other claimant to the judgeship gave me an order on the treasurer. Because of legal questions aside from this matter the treasurer was afraid to pay over the money, but joined with others in urging that our work must not stop. One Mr. Kinna, a patriot in the cause, came to the rescue of the matter and advanced the necessary funds on the order of the court. Both claimants to the judgeship served on a citizens' committee, and approved of a schedule of dates and places for our investigation. We then made these places in their order, giving lectures, visiting homes, meeting people in squads on the roadside, and treating hundreds of cases. Everybody seemed to be helping, and I am told that this subject is the talk of every home there. These are a splendid people, an appreciative people. A very small per cent. are educated, but they manifest the highest type of common sense. There are no foreigners and but very few negroes in the county. All are natives of good names—Stevens, Creekmore, Bell, Worley, Foster, etc.

"Judge Williams, who had been declared the rightful Judge, said, keep up the work at any expense, and it will be taken

care of. It will interest you to know that one old lady walked ten miles to have her family examined. The following day she returned and asked for a box of containers for her neighbors. She went among them on foot and secured 146 specimens in one day. She later delivered the treatment in the same way. She could not read, but said she took along a little boy who could read to deliver the treatments.

"Four men came horseback from Wayne County yesterday to learn what is to be expected of them to get the work extended there. Many have come from Pulaski County and the County Judge says 'come as early as possible. I will give one hundred to start on and call the Fiscal Court together, if necessary, for the balance.'

"We are coming in for a few days. Will see you."

(5) *Dr. O. H. Judkins, Field Director, Texas, to Dr. Boerner, State Director.*—"Dear Doctor: We are completely swamped. It is a physical impossibility for the boys to examine these specimens. There has been a constant stream of people passing through the dispensary all day, and we have had to lock the doors to keep them out. I have talked to them in squads of about 250 in the District Court Room when they would overflow the office. We are sending the specimens to you.

"One box of specimens was sent in from St. Mary's Seminary, LaPorte. These are in a box by themselves, and the report can be sent to Rev. J. M. Kerwin, St. Mary's Seminary, LaPorte, Texas, and it will be necessary to fix the treatments up there and send with the report."

CHAPTER V.

REPORT OF THE SCIENTIFIC SECRETARY

Addresses.—During the year 1913 I have given 73 addresses bearing upon the public health subject of hookworm disease and soil pollution, and in addition to these, several addresses have been given by my Private Secretary.

Lantern slides.—The State Boards of Health now procure their slides directly from the manufacturer, instead of through my office, but I still continue to keep on hand several sets to loan to physicians, teachers, and others who wish to give addresses on this subject.

Microscopic diagnosis.—The State Boards of Health have now had so much experience in the microscopic diagnosis of intestinal worms, that it is only in exceptional cases that specimens are referred by them to me.

Field work.—The greater part of my time this past year has been given up to certain field studies in County Z... and in County X... The results of the work in County Z... are now nearly ready for publication, and will soon be issued. One entire month was spent in campaigning certain counties in two states in the interest of better sanitation.

Investigations.—Of the various investigations under way, or recently published, it is desired to report formally at present only the following:

(a) *A Test to Determine Fecal Contamination of Food.*—For some time past, I have not been able to escape the conviction that improvement in sanitation is not resulting so rapidly as is desirable. The lay mind is aroused in the face of an unusual epidemic that affects business, but seems fairly well contented to permit long-existing conditions to continue

if the annual death rate is not much higher than usual, despite the fact that this rate may be unnecessarily high. An active desire for better sanitation in this country is found chiefly among a relatively small proportion of the medical fraternity, in a relatively much greater proportion of the public school teachers, and in some members of women's clubs. The average American has very little idea of sanitation and very little interest in it. Two important new developments are, however, the increased interest among certain life insurance companies and certain senators and congressmen, exhibited along the line of popular education for better health protection.

It has seemed to me that we have possibly lacked a method of putting the subject before the average lay mind that will be sufficiently striking to arouse popular interest, and I have been giving considerable time and thought to the possible development of some new point of attack. At present, I believe that I have a method that will appeal to the average person, at least to the extent of inducing him to think of the conditions under which he is living.

We find in the intestinal tract of man three minute protozoan organisms that are obligatory parasites, that is to say, these organisms spend their motile stage as parasites, while their non-parasitic existence is confined to spore stages that serve to transmit the infection from one person to another. These three parasites are known as *Entamoeba*, *Lambliia*, and *Trichomonas*. Since they are obligate parasites and since they could not arise by spontaneous generation, their presence in a person's intestine is proof that the person in question has swallowed material discharged from some other person's intestine. The spores are discharged in the feces and can be easily found in privies.

There are several conceivable methods of transmitting these organisms from one person to another, but I am persuaded

that so far as the regions are concerned in which I have been working, the ordinary method is by means of the flies that breed and feed in human excrement, and that these insects carry this material and the protozoan spores to the kitchen and dining room, and smear it on the food. In experiments that have been made at the U. S. Marine Hospital in Wilmington, we have succeeded, in fact, in recovering the spores of *Lambli*a from flies that have visited human excreta.

The parasites mentioned have a very wide geographic distribution. In this country, one or another of these genera is known from New York State on the North, to Alabama on the South, and to California on the West. Thus, a plan of campaign for better sanitation, based on the finding of these protozoa, can be carried out in practically any part of the country.

The method I am trying to present is this: Specimens of fecal material are collected from a number of people, preferably at first, from the children of the more educated and more refined people in a town; these specimens are examined not only for intestinal worms, but also for these protozoa. In case any of the three genera in question is found, the mother of the child is notified by mail that the microscopic examination gives positive evidence that her child has eaten food contaminated, probably by flies, with human excreta, and she is advised to request the local health officer to inspect the block in which she lives to see whether there is not some insanitary privy near-by that is supplying their table with infected flies.

Although this line of educational work is still in its infancy, it is already safe for me to conclude that these letters are followed by a greater and more emphatic demand for the abolition of the surface privy than I have thus far met with in a 13-year campaign against soil pollution.

It is an interesting point of considerable practical import-

ance that seemingly only one family has thus far taken offense at the receipt of these letters.

As an indication of the frequency of these parasites in stools not obtained with salts, it may be stated that recently in a group of 187 unselected cases, the following results were obtained:

Result of Examination	People Living in Homes			
	With Sewer		With Privy	
	Number	Per cent.	Number	Per cent.
Negative.....	88	80	54	70
Protozoa present.....	22	20	23	30
Total.....	110	100	77	100
Protozoa found:				
Entamoeba coli.....	9	8	6	8
Lambli.....	9	8	14	18
Trichomonas.....	2	2	3	4
Undetermined genus.....	2	2	.....	.....

At present I have arrangements completed to apply this test of unconscious coprophagy to all the school children, white and black, of an entire county, and if the results in education along sanitary lines are equal to the present indications, I shall extend the work to other localities. Four State Health Offices have already invited me to make State-wide tests in their States.

I must confess that the slowness of improvement in sanitation in the last 13 years, in the United States, is a very distinct

disappointment, but I am rather persuaded that this new test by which we can state to the mothers that we have proof that their sons and daughters have actually swallowed material that has come from the bowels of some other person (though we cannot state whether that person was white or negro), places at our disposal a method by which we may in the next 13 years create a more active and more intelligent demand for sewer connections or for the sanitary privy than has resulted from the past 13 years work.

While the protozoa and flies in question are far removed from the subject of hookworm disease, from one point of view, it will be seen that when it comes to an improvement of the sanitation in order to eradicate hookworms, these protozoa and flies are able to furnish us with more appealing arguments than even the hookworms.

(b) *Effect of Light Infections.*—There still exist a number of persons who believe that light infections with hookworms are of no clinical importance. This past year it has been possible to study certain phases of this subject and the results will soon be published. For the present all that I desire to state in this connection is that the view that infection with say less than 100 or 50 hookworms is clinically unimportant is negatived by the fact that treatment of such cases has resulted in showing that the children in question have made greater improvement in certain respects, in a given time, than has a control group of children who did not show hookworm infection and a control group of children who did have the infection but were not treated.

A study of the full results of the work in this investigation will require several months longer before the manuscript will be ready for publication.

(c) *The U. S. Marine Hospital, Wilmington, N. C.*—Prior to 1913, I have for several years past transferred my work

in the summer from the Hygienic Laboratory at Washington, D. C., to the Marine Hospital at Wilmington, N. C. Last spring, the Surgeon-General transferred me to Wilmington to take charge of this hospital, so as to give to me in my hookworm work the advantages that naturally result from being constantly in the area of infection. The policy of ultra-economy in its hospitals forced upon the U. S. Public Health Service because of the existing appropriations has not permitted the expansion of the work for which plans exist, but I am greatly in hopes that a change of policy will soon be possible. In the meantime, the facilities of the hospital are being used for laboratory purposes and are thus presenting greater advantages along certain lines than I could possibly have in Washington.

Publications.—The following articles bearing directly or indirectly upon the hookworm campaign, have been printed:

STILES, (C. W.):

1913a. Hospital relief for the country. The possibilities offered by hospital trains in furnishing much needed medical and surgical facilities to rural districts. <Public Health Reports, Wash., v. 28 (5), Jan. 31, pp. 208-212.

1913b. Idem. Reprint No. 115, U. S. Public Health Service. 8° Washington, pp. 1-7.

1913c. Country schools and rural sanitation. Six samples public schools in one county. Does this county need medical inspection in its public schools? The country school teacher. <Public Health Reports, v. 28 (6), Feb. 7, pp. 247-249.

1913d. Contamination of food supplies. The value of protozoa as an aid in determining fecal contamination of the food supply. <Ibidem, v. 28 (7), Feb. 14, 290-291.

1913e. The value of Protozoa in determining fecal contamination of foods. <Science, N. Y., N. S., v. 37 (952), Mar. 28, 498. (Also Reprint 1 p.).

- 1913f. Soil pollution. The chain gang as a possible disseminator of intestinal parasites and infections. <Public Health Reports, Wash., v. 28 (21), May 23, pp. 985-986.
- 1913g. The economic aspects of hookworm disease in the United States. (Read September, 1912). <Trans. 15 the Internat. Cong. Hyg. and Demog., Wash., v. 3, pp. 757-764. (Also Reprint.)
- 1913h. Report of the Scientific Secretary [for 1912, Rockefeller Sanitary Commission.] <Third Annual Report, Rockefeller Sanitary Commission, Wash., public, No. 7, pp. 117-130.
- 1913i. Public Health and Maternity. <Virginia Med. Semi-Monthly, Richmond, Aug. 22, pp. 258-259.
- 1913k. In How Far has the doctrine of cleanliness and public health permeated the medical profession? <Southern Med. J., Nashville, Tenn., Dec. 1, v. 6 (12), pp. 783-784.

STILES, (C. W.) AND ALTMAN, (S. B.):

- 1913a. Snuff and tobacco. Their use by school boys and girls in County Z..... <Public Health Reports, Wash., v. 28 (9), Feb. 28, pp. 379-382.

STILES, (C. W.) AND ALTMAN, (W. L.):

- 1913a. Hookworm disease. Proportion of males to females in the American hookworm (*Necator americanus*), based on 13,080¹/₂ worms from 102 cases. <Public Health Reports, Wash., v. 28 (1), Jan. 3, pp. 7-20.

- 1913b. Idem. Reprint No. 110, U. S. Public Health Service, 8°, Wash., pp. 1-15.

STILES, (C. W.) & BOATWRIGHT, (H. F.):

- 1913a. Thymol administration. Subjective effects in 464 administrations in 243 patients. <Public Health Reports, Wash., v. 28 (29), July 18, pp. 1497-1513. [Also Reprint].
- 1913b. Subjective symptoms of thymol. (Abstract of 1913a.). <Science, N. Y., N. S., v. 37 (952), Mar. 28, p. 498. [Also reprint 1 p.]

STILES, (C. W.) & KEISTER, (WM. S.):

- 1913a. Flies as carriers of *Lambia* spores. The contamination of food with human excreta. <Public Health Reports, Wash., v. 28 (48), Nov. 28, pp. 2530-2534.

STILES, (C. W.) & LEONARD, (G. F.):

- 1913a. Hookworm disease. Number of treatments and number of full doses of thymol administered in 61 hospital and 22 home-cured cases of hookworm infection. <Public Health Reports, Wash., v. 28 (3), Jan. 17, 119-124.

- 1913b. Idem. Reprint No. 113, U. S. Public Health Service, 8°, Wash., pp. 1-8.

HARPER STORAGE

RC Rockefeller San.
248 Commis. for erad.
R6 of hookworm disease
no. 1-8 [405812] 1911-14

My 21 Adolph Michaelis
 10 25 30 C Mrs Wilcox, Dayton
 De 26 30 S II
 Mrs May
 Mrs. Trozin
 23 2 14 S

Rockefeller San. Comm.
Publ. 1-8/1911-14

405812

FIFTH LEVEL

HARPER STORAGE

UNIVERSITY OF CHICAGO



72 648 598